GAS JOURNAL

LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXXX., No. 3363.] WEDNESDAY, NOVEMBER 2, 1927. [79TH YEAR.

Editorial Notes.

What is Done "Free?"

On the agenda for the meeting of the Midland Association of Gas Managers last Thursday was the question, "What is done Free for Consumers?" Owing to the absorption of time by other matters, the members had to limit its consideration to the statements prepared by Mr. C. M. D. Belton, of Shrewsbury, Mr. H. Banks, of Northampton, Mr. A. W. Smith, of Birmingham, and Mr. George Stevenson, of Long Eaton. Had time permitted, we are sure there would have been an extensive discussion; for what was presented gave plenty of scope for relating experiences and practices. Such information, however, is valuable only in so far as the knowledge of what is done in different areas of supply assists in circulating new ideas and in raising standards; methods are bound to be subjective more or less to the circumstances of a district and the conditions under which business is conducted. But whatever the nature of the practices, although they be plethoric in character or anything between that state and the anæmic, they have all one objective, and that is service to the consumer, with a motive. We have to consider the motive, and whether it is all worth while. The motive is the protection and advancement of the business; and protection and advancement have a distinct value in these competitive times. Whatever a gas manager's views may be on the subject—even when the utmost implacability to change from the traditional has been observed—it is interesting to notice that something is sooner or later adopted which marks the nascent stage of what must come, in respect of service beyond the meter. The old order of things has changed. The competitor's methods have to be met, and by better ones than he puts forward. As need develops, even the stiff-backed ones will bend, and accept the inevitable; and those who say that only insufficiency of staff stands in the way of fuller service, will find means to bring about the necessary reorganization to enable it to be done. It is only a question of time.

We agree with Mr. A. W. Smith that the term "free" in connection with this subject is a misnomer. "Nothing is done free; the difference is only in the method of charge." Anything which causes expenditure has to be paid for from some source. Given acceptance of the value of organized and systematic service to the consumers, we are disposed to agree with the President (Mr. F. C. Briggs) that, though the term is so much derided, "psychology" plays a not unimportant part in this matter. We know the value of service, which includes maintenance; the adjectival term "free" appeals to the consumer, and enables much to be done which would otherwise be left undone—in fact, would be impossible. To tell him that he has to pay indirectly if not directly, does not affect him; and it is unnecessary to tell him. If he does not receive an account for the service rendered, he does not want to be bothered with the information that what is done "free" is represented by a fractional addition to the charge per therm. Mr. Smith exhorts the gas manager to be careful as to what services he performs without direct charge to the consumer. In dealing with services and piping in new property, he says that some engineers, in their anxiety to secure this business, have agreed to lay services free. This, he thinks, is wrong. He upholds the principle that "the essence of business is a mutual bargain; and it is a good rule not to give anything without something definite in return." Good as the rule may be theoretically, it does not always pay in practice. Mr. Smith himself supplies useful illustrations. "In Birmingham, we have for many years made no charge for fixing cookers." Why? The answer is that, when the practice was instituted, circumstances were very different. The gas-cooker was new and unproved; coal was cheap, and domestic labour was readily obtainable. In addition, there was the inertia of age-old custom. "With the aid of free fixing, we have installed cookers in over 90 p.ct. of our consumers' houses. To-day 'fixed free' has its advertising value, and is not costly." Thus spoke Mr. Smith, who had previously laid it down as an excellent axiom that "it is a good rule not to give anything without something definite in return." The position of water heating is to-day that of the cooker at its introduction; and Birmingham runs gas-supply pipes free to all circulators and geysers, and only charge hot water and plumbing work at cost price. Electricity is fighting hard for a domestic load—cooking, heating, and hot water supply. It is in a worse position than gas was when the cooker was introduced, because gas is now well established; and therefore it is not surprising that service to the consumer is a growing policy and practice in connection with electrical development. We cannot afford electricity to parade greater attractions before the consumer than we can do. Cast-iron rules cannot apply in these times. Common sense and expediency have to be brought in as factors for the general good of the gas undertaking and its consumers. Our eyes must be set on the ultimate effect rather than on a definite return for everything we do for the consumer. The consumer pays right enough in the end.

We admit that in those last words there is a point which calls for very careful consideration in connection with installation and maintenance—whether the apparatus be hired or privately owned. In the case of hired apparatus, some prefer the maintenance to be covered by the hiring charge; but the difficulty is to get private owners to pay something for maintenance. Yet we know the deplorable, and even dangerous, state to which gas appliances are allowed by some consumers to run without expert attention; we know, too, that these conditions are favourable to the operations of our business rival. We cannot sit idle, and permit these things to be. That would be suicidal. But it is pointed out that the incidence of the cost of so-called "free" maintenance upon the consumers varies in direct ratio to their patronage, and this is unfair

to good consumers. May we call attention to the fact that all the injury done to the undertaking through neglect and the want of maintenance of domestic appliances also falls upon the consumers, and the cost to them of the inefficiency of their appliances is not negligible? All the benefit resulting from the maintenance and development of business operates on the price of gas to the individual consumer in proportion to his volume of consumption. But those gas administrators who are scrupulously exacting in the matter will in time find a useful ally and a salve for their consciences in the construction of the primary charge in a two-part tariff.

The Electrical Grid.

The President of the Institution of Electrical Engineers is Mr. Archibald Page, who is the Chief Engineer of the Central Electricity Board. His inaugural address in the former position has been delivered; and the electrical industry has before it, on the highest possible authority, the fact that the national generation and transmission scheme "will not create a new electrical heaven, or give ninepence for fourpence." It has also been warned that the scheme *per se* will not be a success unless all the purveyors of current do their part in making it so by an intensive development of the demand for electricity. To this the reply will no doubt be given that the original purpose of the project was so to cheapen electrical energy that it would be an aid to the creation of demand. But the real cheapening of delivery to the consumers can only come about by the undertakings continuing to do what they have already been attempting—the enlarging of consumption.

As the points in the address are assembled and set one against the other, wonder is aroused as to what is the real reason for engaging in such a gigantic scheme to secure something which was already, under normal conditions, being successfully accomplished. It is plain that the President does not wish to mislead, with a view to exciting great expectations. He says the extent to which the reduction of production costs will be reflected in the price of energy sold by authorized undertakings will be governed to a large extent by distribution costs. He speaks of "distribution costs," and not of transmission and transforming costs. The proportion of the retail selling price per unit that must be debited to distribution varies from 20 to 75 p.ct., depending on the load factor and the size of the consumer—the average being about 33 p.ct. The President does his utmost to emphasize the point. The best hope of improvement is to reduce capital expenditure per service, and to spread the capital charges over a larger electricity consumption; and there must be a paring down of outlay wherever possible. Recommendations in this regard are the adoption of standard voltages, a slightly reduced standard of continuity of service where conditions warrant, greater ingenuity in design, and a more extensive use of overhead lines. Consumers in most electricity supply areas have had experience of discontinuity of service. To have it coolly suggested that there should be even a slight reduction of the standard of continuity is something which they will not like; and they will regard it as a prospective further strain upon their toleration. Those who have suffered inconvenience will not find much comfort in the statement that our standard of excellence in respect of continuity is unequalled throughout the world, or in the one that of this fact the electrical profession are justly proud. The reason for a little relaxation in the standard of continuity is that "to secure 99·9 p.ct. of continuity involves much greater capital expenditure than does 99 p.ct." There must be a material difference between expenditure and standard of continuity efficiency, inasmuch as we read that, while in the business and shopping centres of large towns nothing but the best is good enough, the policy need not be universally adopted—such "luxuries" as duplicate transformers, switchgear, and cable not being necessary everywhere. Again, the cost of transmission lines must be reduced; hence the towers and overhead wires. Another way to decrease the cost of distribution per unit is to improve the load factor. The President has his eye on the all-the-year-round cooker load of the gas undertakings; and he thinks their hiring methods might be more universally followed by electricity undertakings.

All this shows—and there is more to the same effect—that while politicians may attempt to deceive the public, the Chief Electrical Engineer of the Central Board will not be a party to any such folly as trying to deceive electrical men. He tells them also of what it is hoped the "grid" will effect, and what it will not do. To refer to the latter first. He confesses that it will not appreciably improve the efficiency of generation in the areas of certain power companies and the larger municipalities. That is what has been said all through the piece by electricians who knew what they were talking about, though other people have spoken as though there would be an all-round reduction of the cost of electricity to consumers of every grade and for any purpose. Furthermore, it will not reduce the price of electricity for lighting in our big cities. No possible improvement in production methods could do much in that direction, since the charges on capital expended in giving the service are the preponderant item which controls the price of low load-factor supplies such as lighting. These are naturally heavy in towns owing, among other reasons, to the high cost of the distribution system due to the expense of breaking-up and reinstating modern streets.

Briefly reviewing what Mr. Page says in favour of the grid. It will constitute with the selected stations a complete system for the production and transmission of electricity on a wholesale scale, thus enabling full advantage to be obtained from the diversity of loads, from the correct apportionment of the total load between stations of varying efficiency, and from elimination of obsolete and unsuitable plant. It will also ensure that the capital cost per KW. installed in the selected stations is kept down; and it will be possible for the stations to be located away from the centres of population—thus helping to relieve railway congestion. It will also permit of individual stations being employed of larger output than would otherwise be possible, and of extensions being co-ordinated so as to avoid premature expansion, and at all times closely relate the plant capacity to the actual load. The aggregate amount of spare plant will thus be considerably reduced. The President also portrays the utilization of "blocks" of waste heat or energy from blast-furnaces, coke-ovens, and other sources, which will allow of water-power resources to be adopted—mainly in Scotland and Wales. In short, Mr. Page anticipates that the grid will level up (without levelling down) the efficiency of generation throughout the country—at a price.

In the earlier part of the address, some interesting particulars are given regarding the engineering features of the grid. It appears that the transmission towers—towers not only in name, but actually—are to be approximately 80 ft. high, and 16 ft. square at the base. Drawings show that they are light in construction; and, in the view of the Central Board (who, in respect of their design, took into consultation Sir Reginald Blomfield, R.A.), they will not be eyesores in the landscape. Each three-phase line will have a carrying capacity of 50,000 KVA. at 132,000 volts between phases. The conductors will be placed 12 ft. apart vertically, and will for the Central Scottish Scheme be of steel-cored aluminium, with a diameter of 0·77 in., equivalent to copper of 0·175 square inch section. These details only apply to the main part of the grid; and, of course, the secondary lines radiating from the main ones will be of a very extensive character. Regarding frequency standardization, a change will have to be made where it is considered essential, in order to reap the full benefit of the new programme. It is stated by the President that since the output of the non-standard areas affected is one-fourth of that of the whole country, the alteration will lay heavy responsibility on the undertakings immediately concerned. It is thought, however, that by careful organization consumers will be put to a minimum of inconvenience, and in the long-run will reap substantial benefits from the standardization. It is remarked that the cost of effecting this change is to be spread over the whole of the undertakings—standard and non-standard alike. Referring to the difference of opinion which exists as to the amount of capital expenditure necessary for standardization, it

is computed that, after the work is completed in 1932-33, the incidence of the expenditure on the cost per unit sold should not exceed 0·22d., and this should diminish each year as output increases, until the expenditure is amortized. It is expected that the task will take some eight years to complete, by which time, we take it, the Central Electricity Board will have become the wholesale suppliers of electrical energy to the authorized undertakers, either directly or indirectly.

Employers and Employed Talking Business.

INDUSTRIAL peace is the topic of the day. Politicians, employers, and trade union leaders are talking of it. With the exception of the extremists in the labour world, everybody is heartily sick of the bad old ways, and the desire is growing to escape completely from them and the disaster they bring. It is plain that to deal with this matter we want men of inventive and far-seeing minds, who can visualize prospective conditions from the trend of affairs. It is a fine movement that is taking place. It indicates a new frame of mind; and it must not be allowed to pass. Looking back over long years, there has never—at any rate within our knowledge—been a period in which such a desire existed as is now evidenced to get on to a high road which will preserve industrial peace, and lead to better conditions for all concerned. This change of view was seen recently at the Trade Union Congress, at the Labour Party Blackpool meeting, and at the Mansion House Conference on Industrial Peace. The time has gone by for talking, in the language of generalities, regarding goodwill and mutual understanding in industry. We may talk thus for ever, and nothing will come of it. The inspiring force of a common interest has to be created. Arbitration and conciliation are not enough. Something beyond is necessary—something in the nature of a concrete plan. It must be a scheme which will arouse the interest of the workers in the defence and prosperity of their industry, which will give them a larger stake in the industry which employs them, and which will enlarge their outlook upon life. Only by some such plan can the old feeling of divided interest be eradicated. When we get down to the root of things, it is found that there is no divided interest; but the root of things is not always visible. What is needed is that something visible and tangible shall emphasize the fact, and not something which is to many minds vague and unseen. So far the best method suggested is a form of co-partnership. Its efficacy has been proved in the gas industry—not generally, but in many large and important undertakings.

Among recent events in this connection has been the labour programme, as recently outlined by Sir Alfred Mond, for application to Imperial Chemical Industries, Limited. A Central Labour Department has been established which will deal with all questions affecting the relations between the Company and their army of workers. Specialists will administer the department, and will have the assistance of an Advisory Committee. Local Works Councils, General Works Councils, with a Central Works Council are to be set up. The object of the three different classes of Council is to establish the closest possible contact between all ranks of workers and the directorate and management of the combine. What appears to us to be an innovation is the establishing of a staff grade of workers, in order to give the best men greater economic security, and a higher status than they have previously had. All men of five years' service and over are to be eligible for promotion to the staff; such promotion to be made annually by the directors. It is contemplated that even up to 50 p.ct. of the men eligible may be promoted. Those who are promoted will be paid a weekly wage, instead of an hourly rate; and, in addition, they will receive these considerations: (*a*) A month's notice of termination of employment; (*b*) payment of wages for bank holidays, even if not worked; and (*c*) payment of full wages (less National Health Insurance Benefit) for all certified sick absence up to six months in any year.

The great feature of the scheme, however, is the plan for encouraging all ranks of workers to obtain direct financial interest in the Company. It is on liberal terms, and more so to the lower level of earnings than to the higher. Not only will the workers be enabled to purchase any day the ordinary shares of Imperial Chemical Industries, Ltd., at 2s. 6d. below the mean market price, but free shares are to be presented to them on this scale: To workers receiving £200 a year or less, one free share for every four shares bought; from £201 to £500 a year, one free share for every five shares bought; from £501 to £1000 a year, one free share for every six shares bought; from £1001 to £1500, one free share for every seven shares bought; from £1501 to £2000, one free share for every eight shares. If the worker should die before completing his payments (which may be by instalments spread over two years), the Company will take over his obligations, and hand the shares fully-paid to his next-of-kin. Another condition is that the maximum individual allotment may be such number of shares as can be purchased by an expenditure of a sum not exceeding 20 p.ct. of the annual wages or salary of the employee. To this 20 p.ct. may be added an additional 1 p.ct. for each year of service above five. An employee with twenty years' service, therefore, may spend 35 p.ct. of his wage or salary in securing shares under the scheme. As already indicated, the generosity of these proposals is the first thing that strikes one; and the second is that, unless a form of restriction is placed upon the workers, some of them may be inclined to indulge in speculation with both the free shares and those purchased at below the mean market price. Nevertheless, the Directors are not proposing any direct restriction in this regard; but they reserve the right to refuse to allot further shares to a worker who does not enter into the right spirit of the proposal, which is that of definite co-partnership. That no doubt will be a sufficient deterrent to speculation. We gather that Sir Alfred Mond does not agree with the placing of what he calls "hampering restrictions" in the path of the worker who wishes to become a shareholder in the business in which he is working. But preventive measures against severing the shareholding interest need not take the form of "hampering restrictions" against investment. Indeed, we can conceive cases in which the preventive measures may be the means of turning the thriftless into permanent investors. Sir Alfred's experience is that, when workers invest money in a business, they are not speculators, but people who wish to save money. We admit the truth of that in the majority of cases; but there is usually a minority who are not of the same way of thinking as the majority. We remember how, in the early days of certain other co-partnership schemes, it was found that, among the workers, there was a section of men who utilized their share certificates for the purpose of raising money. But that, we believe, has been altogether wiped-out, and by means which inflict no hardship, but confer benefit upon those concerned. However, the reservation by the Directors of the chemical combine to refuse further allotments of shares where the spirit of the scheme is degraded, will no doubt be a sufficient safeguard. The only difficulty we see about the scheme is that the lower paid workers with families will not have much chance of allocating money for investment, and that is where the distribution of profits on the basis of wages as in the gas industry supplies the workers with the wherewithal to purchase shares, to which they can add any savings from wages that it is possible for them to make.

When the combine was first established, Sir Alfred Mond made this remark: "The goodwill of all those engaged in industry is one of the most valuable of invisible assets; and this is fully recognized by those who will control the future destiny of Imperial Chemical Industries, Ltd." The scheme which we have attempted to outline shows that the Directors seek to develop the utmost goodwill on the part of those who are employed in the work of this huge merger; and it is definite evidence that there is no desire whatever to depress wages or worsen the conditions of those employed. On the contrary, it shows that the directorate are wishful that the workers should become co-partners with them in their enterprise, and so have a material interest in their work and in the efficiency with which it is carried on. When it is learned that the Company have something like 40,000

workmen and workwomen engaged in the large number of factories of different sizes throughout the length and breadth of the country, it gives an idea of the importance of the movement, and of the great example it offers to other industries in respect of the provision of means to promote the concrete participation of workers in the well-being of the industry. It is in keeping with the new spirit which is evident throughout the industrial world, and which has been largely promoted by the unhappy events of 1926. There is wisdom in these views of Sir Alfred: "You cannot make the world more prosperous by mak-"ing the rich poorer; what you want to do is to make "the poor richer. The real solution of the industrial "problem is not to be found in destroying the capitalist, "but in making the worker a capitalist." The gas industry has had an excellent lead in this matter; what Imperial Chemical Industries are doing should be an example to other industries.

An Unreasonable Rating Return.

WE were under the impression that one of the intentions of the last Rating and Valuation Act was to simplify and co-ordinate procedure in connection with assessment questions. But apparently some local rating authorities think that the more inquisitorial, complicated, and labour involving they can make their requirements in respect of the subject to be assessed, the more faithfully will they be complying with the spirit of the Act. No one outside themselves will be willing to endorse that view. Messrs. Ryde, Sons, and Browne, who are well known to our readers in connection with rating matters, have sent us a form which has been received by one of their clients from the local rating authority; and it is a marvellous compilation—in fact, for spaciousness and unreasonableness as a catechism relating to the assessment of a gas undertaking, it would, we think, be hard to beat. To reply to the interrogations, an enormous amount of time would have to be expended, and to what end? Section 40 of the Act of 1925 gives power to the rating authority to require a return containing such particulars as may be reasonably required for the purpose of carrying out the Act. But our correspondents are of opinion that a large proportion of the questions are entirely unreasonable; they even characterize some of them as approaching the ridiculous. Indeed, with their wide experience, they do not remember ever having received such a list of questions from a valuer employed by an Assessment Committee. Nor have they ever found it necessary to ask such a number of questions, many of which have no genuine value as bearing upon the information required for making a proper determination of an assessment. We print in later columns the remarkable document, in order to emphasize the view of our correspondents that it is important that gas companies should consider once for all whether they are required by section 40 of the 1925 Act to answer such an extensive cross-examination, to which no manager or secretary should be exposed, and which should not be answered without taking expert advice.

Rational Public Lighting.

THERE is a part of the address of Mr. W. J. A. Butterfield, M.A., F.I.C., to the London Section of the Society of Chemical Industry which we reserved for separate comment. It deals with matters affecting public lighting; and the expressions of opinion it contains are from one who has made lighting, among other questions, almost a life-long scientific study. It is perfectly obvious that notwithstanding the large number of public gas-lamps there are in existence, many of our lighting authorities are drifting from what are the main considerations affecting street illumination to others which are purely secondary. As we have said before, and we repeat for emphasis, there are two or three aspects of the subject which should have primary weight in the deliberations of all authorities responsible for public lighting. They are that the system of lighting adopted should be (1) that which will give the best account of itself in the worst of atmospheric conditions; (2) that which, in these days of fast-moving traffic in the streets, is the most reliable, and not subject to sudden extinction; and (3) that to which the eyes of drivers can most readily accommodate themselves. These important considerations, however, are being forced into the background, owing to the one fact that (as Mr. Butterfield states) no less than seven-elevenths of the electricity supplied in Great Britain is from works belonging to local authorities, who are also generally the authorities upon whom devolve the provision and management of the public lighting. Possession of the electricity supply should be the last thing that should animate local authorities in respect of such a responsible service as public lighting; but it does, and in a measure which is not justified when the really pertinent aspects of the matter are taken into account.

Although gas does not fear comparison with electricity in respect of cost when based on commercial prices, and not pared-down ones per KW.H. with the view of getting at closer quarters with gas in respect of running cost, we are all aware, and the lighting authorities ought to know, that cost is not a factor of such supreme importance as safety. Mr. Butterfield deals with the plea that the public lighting load is very useful to the electricity undertaking, and enables it to sell current more cheaply to consumers than it otherwise could. He stamps this argument as utterly one-sided. The public lighting load, as he says, is useful to a gas undertaking also, and enables it to supply gas more cheaply to its consumers, "whose pockets, generally speaking, are at least as deserving of consideration as the better lined ones of electricity users." That is so; and, if the object of imposing upon the ratepayers a less intrinsically efficient system of lighting is due to a tender regard for the electricity station load, then the ratepayers pay dearly through both the conversion expenses and the lower service efficiency in the worst of atmospheric conditions, with the breakdown risk. A case is mentioned in "Electricity Supply Memoranda" this week in which a local authority owning the electricity undertaking is carrying out, in sections, the complete conversion of the public lighting from gas to electricity. The first three sections are to cost over £20,000, which has to be repaid in ten years. The interest and sinking fund on this will be considerably more than would have been the case in respect of the relatively small sum which would have had to be spent to change the gas-lamps to the best of modern standards. Regard for the load upon the electricity undertaking takes precedence of the load upon the ratepayers; and this for something inferior to modern gas lighting.

We are told by Mr. Butterfield that "the incandescent mantle gives, next, perhaps, to the acetylene flame, the most perfectly self-diffusing source of light; and, consequently, gas lighting becomes the safest and most satisfactory method of outdoor illumination—especially as it is not subject to the sudden failures over wide areas which occur with electricity." These are things which are ignored, and as frequently as is the question of glare from the fine filaments of electric lamps, particularly of the gasfilled variety. That is a point on which Mr. Butterfield disagrees with the authors of the British Standard Specification for Street Lighting. He finds the specification admirable in most respects; but a serious defect is that the high intensity electric filaments of gasfilled electric lamps may be exposed in clear glass globes in our streets. The method of estimating glare given in the specification does not appear to take any account of the distracting effect on drivers of a light source of very high local intensity, and the attention and discomfort it causes to passengers and persons on foot. In ideal outdoor illumination, the source of the light should attract the eye as little as possible. But the modern idea of the electrical experts—experts at trying to make the best of a physical disability of the electric lamp in public lighting—is to multiply the ill-effects of clear glass electric lamps by fitting plane mirrors in the street lamps, which have the effect of reflecting the obnoxious filament in nearly horizontal beams in the line of the foot and carriage way.

These are all matters which should receive primary attention from our street-lighting authorities, who should not evade the responsibility of giving the best service in

order to add to the load on the local electricity station. Perhaps when electricity is provided by the Central Electricity Board, there will be less temptation to convert the street lamps from gas. Anyway, if those institutions which devote themselves to scientific illumination desire to justify their existence by doing some real good in instructing lighting authorities in essential principles, they must get clear of those excessive bonds of impartiality which forbid breathing a word which may be taken as a disparagement of one or other lighting agent. The members are not called upon to speak of comparative costs; but they need not adhere reverently to the subject of foot-candles in normal circumstances. There is practical work for them to do in laying down the fundamental principles for public lighting, which should include the whole gamut, and not merely those which are acceptable to a claimant for patronage, with the omission of those which it is thought will give offence. It is not the agent which in street lighting is the important thing; it is the realization of the highest possible standards in any state of atmospheric and road conditions which really matters. The lighting authorities need to be educated up to the truth of requirements, and be brought to see that their determinations should be based upon the broadest considerations, and not the narrow one of possession of the local electricity supply.

The Autumn Session.

Parliament will reassemble on Tuesday, Nov. 8; and members will be faced with a programme of legislation and other business with which it will be impossible to deal in the space of six weeks or thereabouts. Certain Bills have been earmarked for prompt attention; others will have to be carried forward to next session. It will be impossible to find time to pass the Companies Bill; and it will have to be re-introduced next year in the form in which it emerged from the House of Lords earlier in the session. On the other hand, the Unemployment Insurance Bill is to be dealt with; and it is anticipated that something like a fortnight of parliamentary time will be consumed by this measure alone.

Making Other Gases.

It will be remembered that, in the Bill of the South Staffordshire Mond Gas Company, powers were sought to manufacture and deal in oxygen, hydrogen, nitrogen, carbon dioxide, carbon monoxide, ammonia, methane, ethylene, acetylene, sulphuric acid, hydrochloric acid, nitric acid, acetic acid, chloride of ammonia, and nitrate of ammonia. The Company, it will also be recollected, did not secure the power; the Unopposed Bills Committee feeling that, if granted without modification, it would be very difficult in future for Committees to refuse, if applied for, similar powers to town gas undertakings. The clause was dropped on a promise by the Unopposed Bills Committee that they would report on the matter to the House. This they did, and quoted the opinion of a representative of the Board of Trade that such a clause might be useful in this country if granted to the larger gas undertakings, as it would encourage the production of gases and chemical compounds which are manufactured in Germany and America, but not to any considerable extent in this country. The Committee recommended to the House that the matter is of such importance that an inquiry should be instituted before a Committee properly composed and equipped for the purpose. It is understood that the Central Executive Board of the National Gas Council have appointed a Committee to investigate the matter, with the view of preparing for any inquiry which may be made.

A Fusion and Four Deaths.

In our "Miscellaneous News" columns to-day, we give a short account of the inquest held last week into the deaths of four persons at Ardwick, Manchester, through poisoning by gas generated by the fusion of an electric cable. The verdict was "Death from misadventure." There was a combination of circumstances which facilitated the entry of the highly poisonous gas from the bitumen in which the cable was embedded into the house where the catastrophe occurred. The gas produced found its way along a disused and unknown culvert, it entered the cellar of the house, passed up the cavity wall, and through the skirting boards into the room where the victims were sleeping. It was proved by Mr. Harri Heep, the City Analyst, that the blood of all four victims showed traces of carbon monoxide. After the event, it was found that a neighbouring gas main had been fractured, presumably by the heat from the electric cable. But it was clear that this had nothing whatever to do with the gas poisoning. One point about it is that between the electric cable and the gas main there was only a space of 5 in. We imagine that the gas main was there before the electric cable. A comment of the Coroner (Mr. C. W. W. Surridge) was that gas mains and electric cables laid in such close proximity must be a source of danger.

Oven Coke for Domestic Use.

Provision is increasing for the production of household coke at colliery coke-oven plants. In describing a new plant at the Rotherham Main Colliery, the "Manchester Guardian" states that "patent oven coke" to some extent is competing with gas coke for domestic and central heating purposes. Part of the new installation will be a coke-breaking plant to reduce the coke to the smaller sizes required for these uses, and for some of the processes in the brass and steel trades. The owners of coking plants find from experience it is preferable to have more than one string to their bow.

The Next War.

According to a paper prepared by Sir Alfred Mond for reading at a dinner of the delegates to the Imperial Agricultural Research Conference at Stockton-on-Tees on the 18th inst., the Great War was fought on Chili nitrate; and he says that any failure on our part to maintain the long sea route would have meant irrevocable national disaster. This condition of affairs, he adds, can never happen again. In this matter, Sir Alfred's eyes are evidently set on Billingham.

Standardizing Coal.

At a conference on Tuesday of last week at the Institution of Civil Engineers—Sir Richard Glazebrook presiding—it was unanimously decided that the British Engineering Standards Association should set up a representative committee to consider the question of standardizing the sampling and analysis of coal, with the view of determining its value to purchasers, particularly in the international market.

"She Stoops to Conquer."

It is hard to please everybody, and the "everybody" includes our women folk. Nevertheless, we like to see them taking a critical interest in domestic gas appliances—particularly gas cookers. A "London Housewife" had a letter on the subject in "The Evening Standard" the other day, and she was full of complaints. The main one was that gas cookers ought to be raised on legs—first, because women are not snakes, and, secondly, because she sees no reason why they should go on their knees to clean a gas-oven. Because they have to do this, she attributes neglect of, and uncleanliness inside, the oven. That is naughty. We seem to have heard something as to straight lines and sinuous forms being rather favoured by the ladies in these times. To keep a lithe figure, exercise is needed, and the cleaning of a gas-stove is not the only thing for which we hope our women go on their knees. Even the floor cannot be hand-scrubbed without bending the knees. Moreover, a gas-oven door does not require to be opened and shut every few minutes while cooking is proceeding.

Cooker Legs and other Matters.

In the fashion of to-day, legs are prominent. Therefore, think some ladies, gas-ovens should be similarly equipped. For many years ovens have been obtainable raised on legs. Of

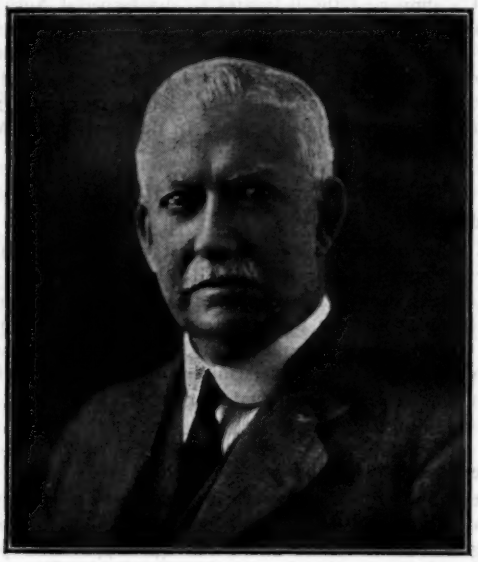
them women have also complained. The legs add to the labour of using the hotplate owing to the greater height to which saucepans, &c., have to be lifted. We are not surprised at the objection, seeing that about 75 p.ct. of the cooking is done on the hotplate, and only the other 25 p.ct. requires the use of the oven. Of course, there are cookers with the hotplate jutting from the side. But this in many small houses or flats is an inconvenience, owing to the greater space required for its accommodation. As to pressure, gas undertakings under the Gas Regulation Act are obliged to give a minimum pressure at the service-pipe; but in cases where the inside piping is provided by the landlord or tenant of a house, it may be of inadequate carrying capacity. If there is a great dread of gas cookers on Sunday morning, why is it they have been so freely adopted that it is the exception to find a house without one, and with a demand for gas on Sunday morning between 11 and 1 o'clock which in many areas forms the peak load of the week? The facts do not support the lady grumbler. If she has experience of bad flames and pressure, and her house piping is right, the trouble comes from unclean conditions inside the oven. This being so, someone in her house neglects the cooker. Who is it?

RETIREMENT OF MR. JOHN GASTEEN.

Long Service in Brisbane.

On Aug. 31 last, Mr. John Gasteen retired from the position of Manager and Secretary of the Brisbane (Queensland) Gas Company, in whose service he had completed fifty years some two months previously, when he was suitably entertained by the employees, and made the recipient of an inscribed gold watch and chain.

On Aug. 27 he was again the guest of the employees at a farewell smoking concert, and was presented with an album of photographs, handsomely bound in leather, descriptive of various phases of the Company's undertaking, and picturing those most directly connected with its activities—Directors, officials, and other employees. A first-rate musical programme was contributed to entirely by employees of the Company; and there were a number of speeches which amply testified to the good service rendered by Mr. Gasteen during his early association with the Company, and to the high esteem in which he is held by all connected with the undertaking. The speakers



Mr. John Gasteen F.F.I.A. F.C.I.S.

included the Hon. T. C. Beirne (Deputy-Chairman of the Company), Mr. E. J. Lord (Engineer), Mr. F. E. Smith (Accountant), Mr. E. G. Oxley (Auditor), Mr. G. Johnson (Foreman), and Mr. W. H. Shedden (Engineer of the South Brisbane Gas Company).

Mr. Lord stated that, unfortunately, owing to long-continued overstrain, resulting in impaired sight, Mr. Gasteen had been obliged (while still in full vigour, and with more than the normal amount of wisdom and business sagacity) to relinquish the position which he had so efficiently filled for a great number of years. The precepts he had laid down would be as honoured by those remaining in his absence as they had been during his presence; and his example of unswerving loyalty, strict attention to duty, and moral uprightness would be taken as a beacon light to those who were, for the time being, left to carry on.

The presentation was made by the Hon. T. C. Beirne, who remarked that the Company had progressed with the growth of the city, and this was attributable to the tact and courtesy of Mr. Gasteen. To have passed through all the grades from junior clerk to Manager constituted a record of which any man might be proud.

Mr. Gasteen feelingly acknowledged all the nice things that had been said, and expressed his indebtedness to the Directors for their kindness and courteous consideration, and his appreciation of the keenness, ability, and loyalty of the Company's splendid staff of employees.

PERSONAL.

Mr. P. F. HOLMES, Chairman of Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, was on Oct. 25 presented by the staff and employees with a silver bowl, in commemoration of his 50 years' connection with the firm.

The Stoke-on-Trent City Council have appointed Mr. J. H. RIOCH, of Inverness, as Assistant Gas Engineer.

Mr. E. ROWLAND WILLIS, of the Southall Station of the Gas Light and Coke Company, succeeded in gaining the Bronze Medal of the Institution of Sanitary Engineers for the best paper read during the session. The paper was entitled "The Hygienic Uses of Gas," and promoted an excellent discussion. The medal was presented at the last meeting of the Institution of Sanitary Engineers held at Caxton Hall last month; and Mr. Edward Willis, Past-President of the Institution, and President of the Institution of Municipal and County Engineers, and father of Mr. E. R. Willis, was in the chair.

At a meeting of the Directors of the Winchester Water and Gas Company on Oct. 24, Mr. J. C. WARNER, who has been Chairman for over 27 years, resigned for reasons of health, which necessitated his residing abroad for the winter months. At the request of his colleagues, he is retaining his seat on the Board. The Directors elected their Vice-Chairman, Col. W. BARROW-SIMONDS (son of a former Chairman) Chairman, and Lieut.-Col. Sir JOHN MANSELL Vice-Chairman.

Mr. ROBERT T. S. SEYMOUR, late Vice-Chairman of the Wimborne Minster Gas Company, Ltd., has been elected Chairman, in place of the late Dr. G. W. Graham, who had been a Director of the Company for 49 years, and Chairman for 7½ years. Mr. CHARLES A. ELLIS has been elected Vice-Chairman, in succession to Mr. Seymour.

The very occasional appointment of City Gas Examiner took place at the Leeds Quarter Sessions, on the 25th ult., when, on the application of Mr. H. S. Houldsworth (barrister), the Court gave its approval to the appointment of Mr. J. FIRTH as Gas Examiner for the City of Leeds, at a salary of £440 a year, in succession to the late Mr. B. A. Burrell; and to the appointment of Mr. J. L. ROEBUCK as Assistant Gas Examiner, at a salary of £60.

OBITUARY.

The death took place on Oct. 29, at Park Road, Ipswich, of ELIZABETH HARWOOD GODDARD, widow of Sir Daniel Ford Goddard, Kt., P.C., in her 78th year. The funeral was at Ipswich Cemetery, preceded by a service at Tacket Street Church.

Mr. R. V. S. HOUGHTON, of Lane House, Helmshore, aged 62, for many years a Director of the Haslingden Gas Company, died recently. Deceased commenced work at the Haslingden Gas-Works, of which he rose to be Manager, holding that position for 26 years. In 1918 he resigned, and was succeeded by Mr. J. T. Broughton. Mr. Houghton had a seizure while attending a masonic function at Blackburn.

Referring to the death of Mr. LEWIS HARDY, F.C.A., which occurred suddenly on Sunday, Oct. 9, the "Co-Partnership Magazine" of the Brighton and Hove General Gas Company recalls the fact that he had been for many years intimately associated with the London office as Auditor of the Company's accounts. He was a skilled Accountant, and held the position of Auditor to many companies and large commercial firms in the City of London.

ELECTRICITY SUPPLY MEMORANDA.

The Campaign.

FURTHER information is available regarding the "E.D.A." Circle Campaign which is now running, and is to continue to the end of March. It is reported that about 100 Electric Circles are taking active part in this piece of propaganda enterprise. Of demonstration houses there are between 30 and 40 in existence in different parts of the country, and more have been arranged for. Exhibitions are being planned in many places. Round about 90 lecturers have been enrolled. For the development of the campaign, district officers have been appointed for the North-East Area in Newcastle-upon-Tyne; for the North Midlands Area in Leeds; for the North-West Area in Manchester; and for the South Midlands Area in Birmingham. London and the South do not appear to be quite so enthusiastic as the more northern parts of the country.

Domestic Electrification.

"The Electrical Review" has been indulging in a domestic electrification number, believing that it will be of large assistance to the electricity industry in stimulating its anxiety and efforts to increase domestic connections. It is a laudable object; but even a laudable object can be overdone. We were under the impression that the Electrical Development Association were at present extraordinarily busy in this direction, that the Circles which they founded last year were alive to their responsibilities, and that the electricity undertakings were devoting their energies everywhere to this particular line of development. Anyway, that was the idea engendered by reading the speeches at the lunches which inaugurated the current Winter Campaign. But the "Review" desired to do its share. In an editorial article it lays stress on the importance of domestic electrical applications to the future of the industry; and we notice the same thing was said the other day by Mr. Archibald Page, Chief Engineer to the Central Electricity Board, in his Presidential Address to the Institution of Electrical Engineers. There is no doubt our competing industry is looking very much to the future. It has recognized that the great super-power stations which are to be evolved will not be in a position to supply in many quarters electricity at a cheaper rate than is being accomplished by local generation at the present time. There come in the higher costs of transmission; and there is a lurking fear that these will be a considerable burden upon many districts, and that therefore, in order to reduce as much as possible such costs per unit, it is essential that the domestic load should be enlarged. Our contemporary tells us that this is the grand objective of the present winter's campaign. Domestic electrification being the objective, it heartily defends the incursion of women into the electrical field. It quotes Lady Brooks, C.B.E., who is the President of the Birmingham and Midlands Branch of the Electrical Association for Women. Her Ladyship urges the importance of wiring new houses, even though, at the time of building, there may be no electricity supply in the neighbourhood. Our contemporary appears to be as little conscious as Lady Brooks that owners of houses cannot afford large amounts of capital to lie idle and wasting, perhaps for years, waiting for the arrival of a supply of electricity. Somebody would have to pay for it—either the landlord or the tenant; and we fear it would be the latter.

Electric Fires.

Dealing with the subject of domestic heating, the "Review" points to the continuously increasing demand for electric fires; and it states that the last two years have seen many more supply authorities introducing rates of charge conducive to electric heating, so that in a large number of towns it compares (even in cost) favourably with coal or gas. Never has the gas industry had a greater rate of increase in gas-fire connections than during the past few years—a rate, we undertake to say, that completely swamps anything that has been done by electric heating. Of its assertion that even in cost electric heating compares favourably with coal or gas, our contemporary is careful to give no confirmation. When electricity is only generated at an efficiency of 18 to 19 p.ct. in the best of power stations, and the coal fire has a radiant efficiency of 24 to 25 p.ct. and the gas fire a heating efficiency of about 75 p.ct., there seems to be something sadly wrong with the deductions of our contemporary. At the present price per ton to the householder, solid fuel, giving a radiant heating value of 25 p.ct. to a room, is vastly cheaper (notwithstanding the stand-by fuel charge) than electrical energy giving 90 or more p.ct. of heat to the room at available or probable costs per unit in this country. What the "Review" has in mind outside the quoted apparent cost is the large proportion of domestic labour absorbed in lighting coal fires and cleaning the grates. But even that might be well paid for in the difference between the actual cost of solid fuel and electricity for rendering the same amount of heating service. We recognize in the case of electric fires, as in that of gas fires, that there is the convenience of lighting and extinguishing at will. Moreover, the gas-fire involves no domestic labour; and it is a much cheaper form of heating than the electrical aspirant. Our contemporary is well aware of this fact, and knows positively that it would not care to deny it, and back-up the denial with a challenge to prove it. It also states that another very important aspect is the hygienic one; but scientific research and common sense assure us that the hygienic conditions of an occupied room are promoted by the use of a heating agent which assists in ventilation, and not one that only contributes to the maintenance of air stagnation. Air stagnation in occupied rooms does not justify the slogan of the present electricity campaign—"For Health's Sake, use Electricity." For the sake of health, the pocket, comfort, and freedom from annoyance, do not use electricity, but employ the larger ranged and more dependable commodity, gas. That is what the majority of people are doing when displacing heating by solid fuel. This verdict is the correct one.

Electric Cooking.

Treating of electric cooking, the "Review" is conscientious when it says: "In spite of the advance which has been made in recent years in the design of the boiling-plate of the ordinary electric cooker, both as regards efficiency and quick boiling, this vital portion still remains a drawback, particularly as regards quick boiling when compared with similar apparatus used in other methods of cooking." But it thinks that this should not impede the progress of cooking by electricity; and the reason it gives is that the "electric kettle adequately fills the missing link." The "Review" should think deeply over that word "adequately." Anyway, it places an enormous responsibility on the electric kettle. A large experience of electric kettles shows the need of having a stand-by one, in order to ensure a certain amount of security in service. But it is not only boiling kettles of water that is important. In cooking, a large amount of water has to be boiled—in fact, it is generally calculated that the boiling operations on a gas cooker (it must be approximately the same with the electric cooker) represent something like 75 p.ct. of the total cooker needs for heat. When we consider this, there is found a mixture of wisdom and humour in the remark: "It is not good business to attempt to hide the weak point while the existence of the means (the electric kettle) of placing electric cooking ahead of other methods renders any attempt to do so little short of folly." If an electric kettle is required, then self-contained electric saucepans and other utensils are also needed, in order to complete the cookery equipment for the service it is supposed to render. Our contemporary is fully aware, or if it is not a little consideration should convince it, that the electric kettle is not a sufficient cover for the multitude of sins of the electric hotplate.

Cost of Water-Heating Installations.

Some instructive figures have been published in connection with a scheme of the Kingston-on-Thames Electricity Committee to let out on hire, sale direct, or hire-purchase electric water-heaters. They propose under the hiring scheme that the apparatus shall be hired for not less than twelve months at these rates: 1½ to 5 gallons, 3s. 6d. per quarter; 6 to 15 gallons, 5s. 6d. per quarter; and 20 to 40 gallons, 9s. per quarter. It will be noted that even the rent for a comparatively small heater—6 to 15 gallons—will work out at 22s. a year, while a 20 to 40 gallon one will require a payment of 36s. a year. Regarding hire-purchase, it is suggested that the water-heaters be sold on the basis of a three-year purchase without a preliminary deposit, but including the cost of installation. On these conditions, the following rates are proposed:

	Quarterly Instalment. £ s. d.
"Inventum" type of heater—	
1½ gallons capacity at	16 0
4½ " " "	1 4 0
10 " " "	1 6 6
22 " " "	2 5 6
"Bastian" type of heater—	
5 gallons capacity at	19 0
10 " " "	1 3 6
15 " " "	1 7 6
20 " " "	1 10 6
30 " " "	2 0 0
40 " " "	2 9 6
"Santon" type of heater—	
12 in. by 3¾ in. in depth at	15 0

Take the 22-gallon "Inventum" type of heater, the charge for that will be £2 5s. 6d. per quarter, which amounts to £9 2s. a year; and in three years the person purchasing on these terms will have expended £27 6s., ignoring repairs. Take the Bastian 5-gallon type for which 19s. per quarter is charged. That amounts to £3 16s. a year; and in three years will have caused an outlay of £11 8s. Electric water heating, it is clear, is no cheap thing. The quoted figures refer to apparatus

and installation only. Nothing is said respecting maintenance, running costs, and the inertness of heating water by electricity, nor as to the heat losses which are cumulative—growing greater the longer it takes to attain a given temperature.

Public Lighting. Following an application of the Stepney Borough Council to the L.C.C. for additional loans for the conversion of gas-lamps to electricity, the Electricity Commissioners were asked for their observations on the proposals. They replied that they require that the conversion of street lighting from gas to electricity should only be undertaken if the mains to be laid in the streets to be electrically lighted are necessary also for the purpose of supplying a reasonable number of private consumers. Naturally, the Borough Council have stated that the streets which have been selected do comply with the requirements. The point as to the Commissioners' stipulation is worth noting. Incidentally, these conversion schemes cost a great deal of money. The L.C.C. on Nov. 9 last sanctioned the borrowing by the Stepney Council of £9000 for the purpose. Being the owners of the electricity undertaking, the Council are determined to oust gas altogether from service in the streets. To enable them to pursue their intention, they have now asked for two further loans of £6300 and £4950—making, with the first loan, £20,250. Of the two further loans, £1249 is for the provision of columns and brackets with lanterns; and the balance is in respect of the cost of providing the necessary services from the mains to the lighting points. The money is to be repaid in ten years from the date of borrowing. The question is whether, in order to obtain improved street lighting, it was necessary to incur the spending of anything like £20,000, which for all we know may not be the end. On that sum interest and sinking fund will have to be provided by the ratepayers. Modern gas-burners could have been installed at much less cost; but the strings which are pulled from the electricity supply undertaking are many. Stepney, too, has a local governing body the majority of the members of which are not averse to any step which will assist in the annihilation of private joint-stock enterprise, so long as it does not affect their individual pockets.

The Ferrybridge Generating Station. A great deal of publicity has been given throughout the country to the opening of the new generating station at Ferrybridge, which has been constructed by the Yorkshire Electric Power Company. To us in the gas industry, in which there are many gas-works in existence supplying much more energy than can be produced from these new super-power stations, the fuss that is made about their potentiality is rather amusing. Take this new Ferrybridge Station. The first section contains a plant equivalent to 38,000 KW., and it has been planned for extension to 180,000 KW., as and when business necessitates. Now 38,000 KW. is only equal to 1296·56 therms, which is the potential heating energy of only 259,312 c.ft. of 500 B.Th.U. gas. The 180,000 KW. would be equal to 6141·6 therms, which is the potential heating energy of 1,228,320 c.ft. of 500 B.Th.U. gas. Thus there is nothing amazing to gas men about the capacity of the new Ferrybridge generating station when measured with gas-works on the comparable potential heat-energy basis.

Mishaps. On Oct. 15 John Henry Harrison was killed instantly while at work at the Ferrybridge Station of the Yorkshire Electric Power Company. He was engaged drilling metal plates with an electric drill, when he suddenly collapsed; and, although artificial respiration was attempted for some time, efforts to restore him were unavailing. Messrs. Fox & Co., Ltd., of Brentford, were summoned before the local magistrates recently for alleged breach of the Factory Acts. The facts, as stated, were that one of their employees—William Rabbitts—was fixing some shafting, and, in doing so, carried an electric lamp attached by flex to a socket in the wall. In climbing the ladder, he received a shock (240 volts), fell to the ground, and died immediately. An expert stated that the lamp leaked, and was not properly earthed; and it was contended that neglect to earth the wire was distinctly a breach of the regulations. On behalf of the firm, it was stated that they knew nothing about the lamp which Rabbitts used. They had not disobeyed the regulations; it was the unfortunate man who had done so. However, the magistrates held that there was a breach of the regulations, but that the case was one which would be met by the payment by the defendants of five guineas costs. Morpeth has recently experienced a total failure of electricity. It commenced at the inconvenient hour of 8 p.m., and continued for about twenty hours. A fire broke out at the Banbury District Electricity Supply Works on Oct. 19, and threatened to assume alarming proportions. The prompt action of the fire brigade, however, confined the outbreak to the store room (where it apparently originated) and the offices, which were considerably damaged. A fire broke out at Rugby House, Chichester, on Oct. 27. The gas and electricity meters are neighbours in the basement; and it was there the fire started. Prompt discovery led to rapid extinction, though the basement was badly burned. The "Western Morning News" reports that on Oct. 25 the electric light failed during the performance of "The Dark Little People" at Griffithstown.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Nov. 3.—British Commercial Gas Association.—Eastern District Committee, at Newmarket.

Nov. 4.—British Commercial Gas Association.—South-Western District Committee, at Exeter.

Nov. 5.—Scottish Junior Gas Association (Eastern District).—Joint meeting with the Western District at Glasgow.

Nov. 5.—Western Junior Gas Association.—Meeting. Papers by Mr. J. Malsbury, B.Sc., of Weston-super-Mare.

Nov. 5.—Wales and Monmouthshire Junior Gas Association.—Visit to the Morriston Works of the Swansea Gas Light Company. Paper by Mr. C. S. Thane on "Some Mechanical Operations in a Gas-Works."

Nov. 8.—National Gas Council.—Meeting.

Nov. 8.—Federation of Gas Employers.—Meeting.

Nov. 9.—London and Southern District Junior Gas Association.—Visit to Watson House.

Nov. 9.—Manchester and District Junior Gas Association.—Visit to the Grappenhall Works of the Richmond Gas Stove & Meter Company, Ltd., Warrington. Paper by Mr. St. Ledger on "Factors that Encourage Water Heating by Gas."

Nov. 16.—Southern Association of Gas Engineers and Managers.—General meeting at the Hotel Cecil, Strand, W.C. 2, at 2.15.

Nov. 16.—British Commercial Gas Association—Executive and General Committee.

Nov. 17.—Society of British Gas Industries.—Autumn general meeting at the Hotel Cecil.

Nov. 19.—Yorkshire Junior Gas Association.—Meeting at Wakefield. Presidential Address by Mr. C. H. Chester, and inspection of the Wakefield Gas-Works.

Nov. 23.—Institute of Fuel.—Annual meeting at the Institution of Electrical Engineers.

Nov. 23.—Scottish Junior Gas Association (Western District).—Visit to the Clydesdale Iron and Steel Works, Mossend, of Messrs. Stewarts & Lloyds, Ltd.

Nov. 24.—Manchester District Institution of Gas Engineers.—Quarterly meeting in Leeds.

Nov. 25.—London and Southern District Junior Gas Association.—Meeting at the Westminster Technical Institute, 7.30. Paper by Mr. T. Campbell Finlayson.

Dec. 6.—British Commercial Gas Association.—West Riding of Yorkshire District Committee, at Leeds.

Dec. 8.—British Commercial Gas Association.—Midland District Committee, at Birmingham.

Institution of Gas Engineers.

Nov. 7.—Emergency Committee.

Nov. 7.—Finance Committee.

Nov. 7.—Council Meeting.

Nov. 15.—Public Works, Roads, and Transport Congress. Morning—Joint Session with Incorporated Municipal Electrical Association for discussion on "Street Lighting." Afternoon—Institution Session for discussion of "How the Gas Industry can Assist Smoke Abatement."

The Staveley Genealogical Tree.—The Staveley Coal and Iron Company, Ltd., of Chesterfield, have published a very complete genealogical tree showing in graphic form the products obtainable from the bases of coal, ironstone, clay, sand, and limestone.

"Elland" Intermittent Verticals.—It is of interest, in connection with Mr. Robert Fife's paper before the Scottish Junior Association (see "Journal" for Oct. 19, pp. 195-7), to note that the Kilmarnock verticals (the "Elland" system of intermittents, by Robert Dempster & Sons, Ltd., Elland) were put into operation in the early part of 1915, so that they have been working for twelve years. These, among many other early installations of verticals, are building up the history of the trustworthiness of vertical retorting.

A LOCAL RATING AUTHORITY'S REQUIREMENTS.

An Unreasonable Return Demanded.

We have received the following letter from Messrs. Ryde, Sons, & Browne, which firm are well known to our readers in connection with the valuation of gas undertakings for rating purposes. It will be seen that the communication calls attention to a matter which should be dealt with at once, inasmuch as it will be far better for gas undertakings, at the initial stage of procedure under the Rating and Valuation Act of 1925, to arrive at some understanding regarding the requirements of local rating authorities, than to be exposed to such an avalanche of requirement as is illustrated in the document accompanying our correspondent's letter. The communication and the document speak for themselves.

SIR,—We enclose a copy of a Form which has been received by one of our clients from the Local Rating Authority. We think it is important to gas companies to consider once for all whether they are required by Section 40 of the Rating and Valuation Act, 1925, to answer such an extensive cross-examination.

The Section in question gives power to the Rating Authority to require a Return containing such particulars as may be *reasonably required* for the purpose of carrying out the Act. In our judgment a large proportion of the questions asked are entirely unreasonable, and would not assist the Rating Authority to arrive at the rent at which the premises might reasonably be expected to let. Gas companies do not as a rule possess a sufficient staff of clerks to get out the amount of information asked for, especially in reply to No. 8. We certainly do not remember, in a very long experience, ever having received such a list of queries from a Valuer employed by an Assessment Committee, nor have we ourselves ever found the necessity for asking such questions.

Some of the questions approach the ridiculous, as for example:

(10) State present price of coal purchased as follows:
(*a*) Present contract, giving dates.
(*b*) Contracts for the future (probable and certain), giving dates.

And again—

(12-15) Probable future price of coke, tar sulphate, and any other residual products.

These prices, as you know, vary from week to week.

Certainly no manager or secretary should embark on the task of answering such a list of inquiries without taking advice on the subject.

RYDE, SONS, & BROWNE.

49 *and* 50, *Parliament Street,*
Westminster, S.W. 1,
Oct. 26, 1927.

THE ENCLOSURE.

(*Form G; Gas Undertakings.*)

BOROUGH OF
URBAN DISTRICT OF
RURAL DISTRICT OF

Parish or Ward
No.

RATING AND VALUATION ACT, 1925.

Notice requiring Return for the Assessment of Rateable Property.

To

or other The Occupier, Owner or Lessee.

per

In pursuance of the provisions of the Rating and Valuation Act, 1925, you are hereby required to make with respect to the property above-mentioned a true and correct Return of the particulars set out on the reverse side hereof, and return the same to me, the Officer duly authorized by the
to make this requirement, at the under-mentioned address within 21 days from the service of this Notice.

Dated this 24th day of October, 1927.

Name

Town Clerk.

Address

NOTE.—By sections 40 and 41 of the Rating and Valuation Act, 1925, Rating Authorities and Assessment Committees are authorized to serve notice on the occupier, owner or lessee of any hereditament requiring him to make a return containing such particulars as may be reasonably required for the purpose of carrying out the Act; and section 42 of the Act provides as follows:

"42 (1) If any person on whom notice has been served under any of the provisions of the two sections of this Act last preceding fails without reasonable excuse to comply with the notice, he shall, on summary conviction, be liable in respect of each offence to a fine not exceeding twenty pounds, and to a further penalty not exceeding forty shillings for each day during which the default continues after conviction.

(2) If any person wilfully makes or causes to be made a return under either of the two sections of this Act last preceding which is false in any material particular, he shall, without prejudice to any liability to be proceeded against under any other enactment, be liable on summary conviction in respect of each offence to a fine not exceeding fifty pounds."

By section 68 the expression "owner" means the person for the time being receiving the rack-rent of the lands or premises in connection with which the word is used, whether on his own account or as agent or trustee for any other person, or who would so receive that rent if the lands or premises were let at a rack-rent.

(*Form G; Gas Undertakings.*)

Borough or Parish in which Chief Office is situated.

Return to be rendered by an Occupier, Owner or Lessee of Rateable Property.

NOTE.—The answers to the following questions should be given on sheets of paper (write on one side only) and attached to one of these forms.

At the bottom of each sheet should appear the signature of the Responsible Officer of the Occupiers, Owners, or Lessees beneath the following Declaration:

"I declare that the foregoing particulars are in every respect fully and truly stated to the best of my judgment and belief."

Given under my hand this day of 192

..... Signature.
..... Official Position.
..... Official Address.

1. State whether the Undertaking is:
(*a*) Statutory Company.
(*b*) Non-Statutory Company.
(*c*) Local Authority.
2. Give particulars of scheme (if any) whereby the price of gas charged and the amount of dividend are limited or related.
*3. Give a statement showing items of receipts and expenses for each of the last five completed years of account.
4. Give a list of Parishes in which you are permitted to supply gas, or, in the case of non-statutory undertaking do supply gas, showing:
(*a*) The gross receipts for the last complete year of account in each Parish.† (If no receipts, write "none.")
(*b*) The lengths and sizes of all mains which pass through the Parish† untapped. (If no such mains, write "none.")
(*c*) The lengths and sizes of all mains running between works and works. (If no such mains, write "none.")
(*d*) The lengths and sizes of all mains in each Parish† which did not produce revenue during the whole of last year of account, but were laid down for the purpose of producing revenue. (If no such mains, write "none.")
(*e*) In which Parish† or Parishes† Works, Holder Stations, or other premises exist; give short description and exact situation.
*5. (*a*) Give particulars of gas bought in bulk during each of the last five years of account, stating from whom bought.
(*b*) Give name of Parish† and exact position where the bulk gas is measured—or delivery taken.
*6. (*a*) Give particulars of gas sold in bulk during each of the last five years of account, stating to whom sold.
(*b*) Give name of Parish† and exact position where the bulk gas is measured—or delivery taken.
7. Give numbers and sizes at the present date—(*i.*) On hire; (*ii.*) In hand—of the following:
(*a*) Meters, ordinary.
(*b*) Meters, slot.
(*c*) Cookers.
(*d*) Fires.
(*e*) Particulars of other apparatus.

NOTE.—Exclude items sold on hire-purchase system and items in hand for sale.

*8. Allocate the capital of the undertaking as appearing in the accounts, as follows:
(*a*) Land.
(*b*) Buildings.
(*c*) Mains.
(*d*) Holders.
(*e*) Plant and machinery.
(*f*) Items in Question 7 above.
(*g*) The rest.
9. State price of gas charged to ordinary consumers as follows:
(*a*) At present date.
(*b*) At each change of price during the last five years of account—giving date of each change.
(*c*) Average price of gas sold during last year of account.
(*d*) Any decision affecting future prices, especially at April 1 next.
10. State price of coal purchased as follows:
(*a*) Present contract, giving date.
(*b*) Contracts for the future (probable and certain), giving dates.
(*c*) Average price during period of last year of account.
11. State price of oil purchased as follows:
(*a*) Present contract, giving dates.
(*b*) Contracts for the future (probable and certain), giving dates.
(*c*) Average price during period of last year of account.
12. State price of coke and breeze sold as follows:
(*a*) Present price.
(*b*) Probable future price.
(*c*) Average price during period of last year of account.

* If there exists any printed matter giving any of the information required above, please attach the printed matter to this form and write opposite the appropriate items "See printed matter marked attached."

† The word "Parish" wherever it appears means Civil Parish, Borough, or Urban District.

13. State price of tar sold as follows:
    (*a*) Present price.
    (*b*) Probable future price.
    (*c*) Average price during period of last year of account.
14. State price of sulphate of ammonia (or ammoniacal liquor) sold as follows:
    (*a*) Present price.
    (*b*) Probable future price.
    (*c*) Average price during period of last year of account.
15. State price of any other residual products sold as follows:
    (*a*) Present price.
    (*b*) Probable future price.
    (*c*) Average price during period of last year of account.
*16. State the amount, in cubic feet and therms, of gas sold during each of the last five years of account.
*17. State the amount of coal bought during each of the last five years of account.
*18. State the amount of coke and breeze sold during each of the last five years of account.
*19. State the amount of tar sold during each of the last five years of account.
*20. State the amount of sulphate of ammonia (or ammoniacal liquor) sold during each of the last five years of account.
*21. State the amount of any other residual products sold during each of the last five years of account.
*22. State the percentage on each class of capital distributed as dividend during each of the last five years of account.
23. State whether the whole of the property is freehold—if not, give full particulars of the tenure.
24. Give the declared calorific value of gas sold at the present time and particulars of any changes during the last five years of account.
25. Give maximum day's output of plant.
26. Give average day's output during the last twelve months of account.

THE AMERICAN GAS ASSOCIATION MEETING.

By A MEMBER DELEGATE.

Since 1921, the American Gas Association has met each year at Atlantic City. This year we came to Chicago, because of the feeling that continuous sessions on the eastern edge were unfair to the middle and western sections of our country. It was realized that Chicago did not afford the splendid facilities enjoyed at Atlantic City for the display of gas-using appliances and apparatus concerned with manufacture and distribution. Also, the available display space of 30,000 sq. ft., half as much as last year, did not permit the free use of working models. A second objection to Chicago was the thought that, though centrally located in the States, its distance from the more densely populated East would cause a large decrease from the attendance of previous years. The registration of 3250 proved that this forecast was wrong; and the meeting lost nothing through lack of numbers or enthusiasm.

With commendable promptness, the first session of this ninth meeting was called to order by President A. B. MacBeth at ten o'clock on Tuesday morning, Oct. 11. He faced an attentive audience that soon filled every one of the thousand seats. His short speech of welcome was followed by reading the customary greetings from the sister societies in Great Britain and on the Continent.

The Treasurer reported $433,000, receipts for the general fund, and its cash balance of $41,000. The newly established Association Laboratory received $57,000 for testing fees, and had on hand $159,000 for future work. The Industrial Gas Research Fund spent $21,000, and has $113,000 balance. These figures are even larger than those of last year. As compared with the resources available for Gas Association work ten years ago, they are enormous; and yet as compared with the combined revenue in 1926 of $750,000,000, they represent a small outlay.

The Managing-Director, Alexander Forward, gave statistics of the industry and of the Association, showing continued expansion. Due to the recent amalgamation with the Natural Gas Association, these data now refer to natural, as well as manufactured, gas. The year 1926 gave an increase of 600,000 customers, to make 14,731,000, using 492 billion c.ft. of manufactured gas in a total of one trillion, seven hundred billion cubic feet. The great change that has occurred in the manufacture of water gas is shown by the 90 p.ct. (315,000 tons) increased use of bituminous coal in the generator. Headquarters staff now numbers 39 persons, and there are 28 at the Cleveland Laboratory. These forces will be increased during 1928. Such are the resources of a united industry.

The President's address reviewed the progress made during 1926 in carrying-out the five-year programme of Association work. He showed how firm a foundation has been laid on which to build the work of the future.

Then followed the election of a President, Vice-President, and Treasurer. Other officers were chosen later by the company members; and the various sections and the names are as follows:

GENERAL OFFICERS.

President.—O. H. Fogg, New York, N.Y.
Vice-President.—B. J. Mullaney, Chicago, Ill.
Treasurer.—C. E. Paige, Brooklyn, N.Y.

Directors of Executive Board to serve two years:

H. C. Abell, New York, N.Y.
C. M. Cohn, Baltimore, Md.
J. S. DeHart, Jr., Newark, N.J.
F. C. Freeman, Providence, R.I.
R. W. Gallagher, Cleveland, Ohio.
Arthur Hewitt, Toronto, Canada.
T. N. McCarter, Newark, N.J.
F. H. Payne, Erie, Pa.
H. S. Schutt, Philadelphia, Pa.

SECTIONAL OFFICERS.

Accounting:
Chairman.—Edward Porter, Philadelphia, Pa.
Vice-Chairman.—F. H. Patterson, Rochester, N.Y.

Commercial:
Chairman.—J. J. Burns, St. Louis, Mo.
Vice-Chairman.—G. M. Karshner, New York, N.Y.

Industrial Gas:
Chairman.—F. C. Mackey, Chicago, Ill.
Vice-Chairman.—J. P. Leinroth, Newark, N.J.

Manufacturers:
Chairman.—H. L. Whitelaw, New York, N.Y.
Vice-Chairman.—J. A. Fry, Detroit, Mich.

Publicity and Advertising:
Chairman.—E. F. Gardiner, Chicago, Ill.
Vice-Chairman.—J. M. Bennett, Philadelphia, Pa.

Technical:
Chairman.—W. C. Beckjord, New York, N.Y.
Vice-Chairman.—H. E. Bates, Chicago, Ill.

R. W. Gallagher, who is the Chairman of its Managing Committee, spoke on "The Laboratory—To-day and To-morrow." As one instance of the great interest in, and support given to, its work, he cited its appointment to act for the Canadian Gas Association. The approved list of appliances is now sufficiently varied for all gas company purchases to be made from this list; and this should be done for the public good. It seems increasingly evident, however, that research work will prove to be the most important duty. One of the first research jobs has been a study of possible variations in specific gravity with unchanged appliance adjustment and heating value.

In "Economic and Engineering Aspects of the Gas Industry," Past-President H. C. Abell said that gas must compete with other fuels in the delivery of heat, and must depend for success on its value to its users. Long-hour use must be found to increase the present rate of capital turnover. On the engineering side, he stressed the necessity for more and more research.

The second general session on Wednesday morning opened with reports from a number of Committees concerned with the relations of the Association to various other national bodies, such as the U.S. Chamber of Commerce, the U.S. Bureau of Standards, the National Fire Protection Association, and the American Engineering Standards Committee.

This was followed by a stirring and thought-provoking address—"Essentials of Prosperity"—by James A. Emery, of the National Association of Manufacturers. He quoted from Burke to show that this country has always possessed the capacity to anticipate the effect of Governmental interference with private affairs. He called attention to the enormous multiplicity of laws accompanied by an unprecedented increase in state and local taxation. Taxes, especially those on corporations, were too high in relation to the yearly revenue applicable to surplus. A direct appeal was needed to gasworkers and shareholders and to the general public, to overcome the present tendencies of government.

The next speaker, Samuel Insull, is a native of England, who has done more than any other man in recent years to furnish gas and electricity at moderate prices but with proper return on investment. His text was "Some Comments on the Gas Industry." Six years ago, at the last Chicago meeting, he spoke in a similar vein. This year he acknowledged the definite progress made during the interval; but no one, he said, should be content. The ultimate goal of each gas company was to supply the heat required for every heating job for which gas was suitable. (He assigned to electricity the field of power and light.) At present, manufactured gas supplies only 2 p.ct. of the country's total heat requirements. A sixteen-fold in-

crease was possible. He looked forward to the same concentration of manufacturing and long-distance transmission of gas as now obtained for electricity. He mentioned one 187-mile gas transmission line in Indiana. He considered that electricity had prospered better than gas because the former industry had excelled in research, rate structure, and salesmanship.

After this very forceful presentation of the ways in which the industry could with profit put its house in order, the Association decided to return to Atlantic City for the 1928 Convention.

"The Public Services," by J. F. Shaughnessy, President of the National Association of Railway and Utilities Commissions, bore testimony to the successful efforts of the industry to keep down gas prices, and urged the importance of a trained personnel for good service. In recent times, until this year, one evening has been devoted to the relations with state commissions. These questions are now handled so well in daily routine as to have become a minor feature on the annual programme.

W. A. Jones, in "Executive Interest in and Responsibility for Sales," pleaded the necessity for constant attention to this subject by the best brains in each company.

At the end of this second session, and again just before the third session on Thursday morning, there was an opportunity to view the A. G. A. Resuscitation Film. This takes fourteen minutes to present, gives in detail the use of the prone pressure method of resuscitation, and will add appreciably to the influences now exerted in this field of life-saving. The film may be purchased for cost (one hundred dollars) by any company member.

The Thursday morning session began with brief, but very interesting, summaries of the work of the following Committees: Rate Fundamentals, Rate Structure, Accident Prevention, Customer Ownership, Education of Gas Company Employees, and Co-operation with Educational Institutions. The first two showed substantial progress in the establishment of scientific rates for the various types of service offered to customers. As to customer ownership, 91 companies in 1926 sold $120,000,000 of securities to customers and employees. Each company was urged to adopt such specific programme of education as might be suited to its needs, with one person responsible for results.

Again were heard the two prominent *motifs*—research and industrial sales—that formed part of the entire convention symphony. Clifford E. Paige, a Vice-President of one of the largest companies, spoke on "The Executive and the Industrial Load." It was a statement on the importance of this load, the money now being devoted to research in the application of gas to heating processes, and the value to each company of special attention by the management to the industrial gas salesmen.

"The New American Tempo," by Robert R. Updegraff, was an expression of the speaker's belief that in the last decade had come a change in the speed of living that boded ill for any industry unable to meet the demand for novelty. He thought that gas would be successful through the "magic of modern chemistry."

For some years a Medal and Diploma have been awarded to all employees of gas companies saving life by the prone pressure method. Though presentations are made during the year at various gatherings of gas men, there were forty medals on the platform for the donor, Mr. Thomas N. McCarter, to bestow. Nearly half the recipients were there in person, being sent a thousand miles or more by their companies. There was one woman—a special exception to the employee rule—who had learned the method from her husband, and had saved a neighbour's life. The "A.G.A." Meritorious Service Medal was awarded to a workman who, at the risk of his own life, had saved a fellow employee from being overcome by gas.

For the Commercial Section, the Committee on Resolutions recommended that companies sell only those appliances approved by the "A.G.A." Laboratory. It seems certain that in a comparatively short time the "Blue Star" of laboratory approval will dominate the selling of gas-using appliances.

"The Elimination of Fatigue," by Dr. Lillian Gilbreth, showed the many existing services rendered by gas in this field, but pointed out various ways for further improvement.

To bring to a fitting close this final session, the Association turned to a man who has been prominent in gas matters on both sides of our Northern border—Arthur Hewitt, of Toronto. In well-chosen words he did justice to "Passing Another Milestone." With the falling of the gavel came the end of the ninth convention, but the tenth loomed into the view of many of us as we left the hall. *Vita brevis, ars longa.*

This account so far has described the morning sessions only, attended by audiences of five hundred to one thousand, and considering the general phases of the industry and its relations to the national life. Each afternoon for four days, beginning with the Manufacturers' Section on Monday, there were sectional meetings on accounting, commercial, industrial gas, and technical subjects, amounting in all to twenty-two sessions, covering sixty-three hours, and with hundreds in each gathering. Dr. Wilfred Francis, of Sheffield, and G. M. Gill, of London, lent an international aspect to the speakers' list. One meeting was primarily for women employees, in which the presiding officer and all but one of the speakers were women. There were also three "Home Service" sessions in which the women predominated.

Surely the above programme furnished a variety of work for all tastes; and the atmosphere of the Convention was distinctly industrious. The President's reception, golf privileges, and three nights of dancing were available to all, and there were several functions for the ladies; but entertainment was decidedly a minor chord. On Friday morning the opportunity was given to inspect the gas-works, and many factories using gas in their processes.

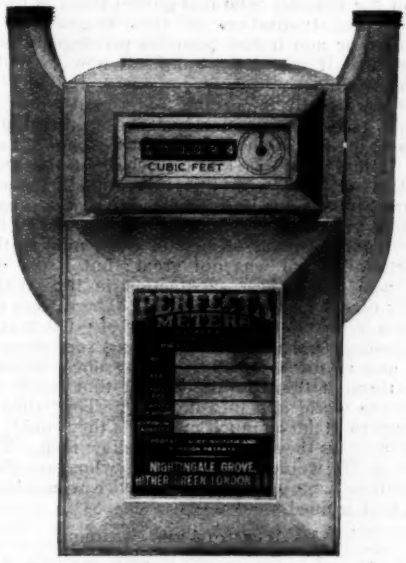
Knowing, as we do, that an industry progresses only as it gives thought to its problems, and that each individual benefits in proportion as he gives of his services to the common cause, is there any wonder that we of the American gas industry leave Chicago with great hope for the future?

A NEW HIGH-CAPACITY METER.

Direct Reading Index.

A high-capacity meter designed on new lines—as distinct from adaptation of "lights" or "standard" meters—has been brought out by Perfecta Meters, Ltd., of Hither Green, S.E. 13. The high capacity of this new meter—the "Perfecta," as it is called—is the result of reducing to a minimum the friction of the driving mechanism and the resistance of the flowing gas. The absorption of pressure between inlet and outlet has been reduced at all pressures.

The driving mechanism and registration differ from the present types of meter. The working mechanism of the "Perfecta" meter acts in a vertical plane from the first, driving direct on to a horizontal axis. By this arrangement, the tangent and the worm wheel are eliminated. The flag rods are situated at diagonally opposite corners of the meter, and the "trousers piece" and the gas chamber in the top section of the meter are dispensed with. The valves are positioned at the inlet and outlet of the meter, and are large. The flow of gas is smooth, and oscillation negligible.



The diaphragm is rectangular, with rounded corners. The "in-and-out" movement is small; and as the diaphragms work on rollers, the leather does not become creased. Excessive bending or rubbing of the parts against one another is eliminated. There is no soldering near the diaphragm, and consequently no risk of damage to the leather by heat or acid; and owing to the shape and position of the diaphragm, there is no possibility of the lower part of the leather reaching down into the condensation sediments.

The meter is constructed in three chambers only, and the whole of the case is utilized for registration of the gas. As an example of the small space occupied, it may be mentioned that a "Perfecta" P.A. meter having a guaranteed maximum output of 90 c.ft. per hour, is only 10 in. broad, 14 in. high, and 7 in. deep. These dimensions are over-all, and include the unions.

"Perfecta" meters are manufactured in sizes from 90 c.ft. to 3600 c.ft. maximum output per hour. The prepayment pattern of meter is constructed on the same lines as the ordinary. The prepayment attachment is of the dual coin type.

If desired, a direct reading index can be supplied. This shows in a plain row of figures the actual consumption of gas, reading from 1 to 999,999 c.ft., and returning automatically to zero at one million. The index can be adapted to read in therms instead of in cubic feet. Application has been made for approval of the Board of Trade for this index.

Altogether the "Perfecta" meter is an interesting model.

MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

AUTUMN GENERAL MEETING.

The Autumn General Meeting of the Association was held last Thursday afternoon, in the Grand Hotel, Birmingham—Mr. F. C. BRIGGS, Assoc.M.Inst.C.E., of Dudley (the President), in the chair. Among those present were Mr. C. S. Shapley, of Leeds (the President of the Manchester District Institution of Gas Engineers), and several members of associations not solely connected with the gas industry.

The HON. SECRETARY (Mr. T. Thornton, of Rowley Regis) announced the receipt of a number of apologies for absence, and read the minutes of the annual and spring meetings, which were confirmed.

NEW MEMBERS.

The following new members were balloted for, and subsequently announced to have been elected:

Mr. Arthur Henry Cranmer, Assistant Manager, Wolverhampton.
Mr. J. William Ford, Engineer, Bolsover.
Mr. Richard H. Ginman, Engineer, Leek.
Mr. Edgar Race, Manager, Killamarsh.
Mr. Claude C. Sidaway, Engineer, Droitwich.
Mr. A. W. Smith, General Manager, Birmingham Gas Dept.

INSTITUTION BENEVOLENT FUND.

The HON. SECRETARY read a letter from Mr. Walter Dunn, stating that at a recent meeting of the Committee of Management of the Benevolent Fund of the Institution of Gas Engineers it was unanimously resolved that a cordial vote of thanks be passed to the District Associations for the contributions which they had so kindly made to the fund.

PRESENTATION OF CERTIFICATES.

The PRESIDENT said his next duty was a particularly pleasant one—namely, to present certificates to some of the younger members of the industry who had gained them in the examinations under the Institution of Gas Engineers' Education Scheme. A year ago it had been his privilege to perform the same duty; and it was a little difficult now to find anything fresh to say. One could only emphasize the fact that these certificates were really important. The man who got through the ordinary grade examination had done something; the man who passed in the higher grade had done a considerable amount. It had been his lot, on behalf of the members, to have close association with this Education Scheme; and the more intimately one got into touch with it, the greater did its value appear to become. The gas industry had in it very few "plums," from the point of view of the "man in the street." The monetary reward was not great; but it did offer what, after all, was the highest satisfaction in life—that was, the opportunity of service to other people. There were many ways of making a living; but it was a source of great gratification to have the feeling that one was producing something from raw material, and at the same time serving one's fellow men. It was only through this line of thought that peace would ever come into the world and into industry. They should all have the aim, not to make as much money as they could, but to give as much service as they could to their fellow men. The greatest happiness in life would come to those who gave the best service; and those who gave the best service would be those who had been best trained.

AN APPEAL TO THE SENIORS.

Might he appeal to the seniors to give, perhaps, a trifle more thought to this Education Scheme? Candidly, it was not yet a success. The Scheme was there; the whole organization was complete. There were now District Committees to advise students. But the students were not there. At a recent Committee meeting, it appeared that over the very large area of the Midlands extending practically from Bristol to Manchester there was only one centre at which there was a recognized course in Gas Engineering or Gas Supply functioning. In what might be termed the immediate surroundings of Birmingham there were nearly a hundred gas-works; and surely each one of these could produce a student. There were two other centres recognized, which did not function, purely through lack of students; and in Birmingham this year, there were only four students in Gas Supply. This seemed rather an appalling state of affairs for the future of the industry; and he felt that more should be done to produce students. Each one of them should consider whether, by advice or by help, he could not do something to furnish more students for these classes. If need arose, courses of instruction would be arranged in other centres. It was, however, up to them in the first place to produce the students.

He then presented certificates to the following five successful candidates in the Higher Grade Examinations in Gas Engineering and Gas Supply:

Mr. R. L. Greaves, 1st class Gas Engineering.
Mr. C. E. Stoddart, 1st class Gas Engineering.
Mr. F. L. Atkin, 1st class Gas Supply.
Mr. J. E. V. Cæsar, 2nd class Gas Engineering.
Mr. D. J. Ward, 2nd class Gas Engineering.

OFFICERS FOR THE ENSUING YEAR.

It was stated that, no nominations having been received by the Committee, they recommended the following as office bearers for the ensuing year:

President.—Mr. W. G. S. Cranmer, of Willenhall.
Vice-President.—Mr. C. M. D. Belton, of Shrewsbury.
New Members of Committee.—Messrs. J. T. Lewis (Wellingborough), E. D. Wootten (Malvern), and Fred. Lee (Hinckley).
Auditors.—Messrs. Fred. Davies (Walsall) and W. S. Morland (Gloucester).
Hon. Secretary and Treasurer.—Mr. T. Thornton, of Rowley Regis.

These recommendations were unanimously endorsed by the meeting.

The PRESIDENT said the Committee's recommendation for the position of President was particularly welcome. Mr. Cranmer had done yeoman service for many years as Secretary; and he was always working for the good of the industry. His connection with the education of students in Gas Engineering and Gas Supply rendered his appointment specially opportune.

Mr. J. R. DUFF (Banbury) cordially seconded the proposition.

Mr. CRANMER, returning thanks for his election, pointed out that his time for taking the chair would almost exactly synchronize with his completion of thirty years' membership of the Association.

APPLICATION OF AUXILIARY PRODUCER GAS FIRING TO WASTE-HEAT BOILERS.

Mr. C. F. W. RENDLE, of Redditch, then read a paper on this subject, which (with a report of the ensuing discussion) is unavoidably held over.

JUBILEE CELEBRATION.

The PRESIDENT remarked that next January the Association would be fifty years old; and it was thought that the event should be suitably celebrated.

The matter was discussed; and it was decided to arrange a function for Thursday, Jan. 26.

PRESIDENTIAL SOUVENIRS.

The PRESIDENT said another matter which had been referred to the Committee was a suggestion that a presentation should be made to Past Presidents. What appealed most to the Committee was an engraved silver-gilt medal, with a ribbon and brooch, and a bar for each year of office. The idea was that the presentations should be made at the jubilee celebration.

The proposal was unanimously agreed to.

WHAT IS DONE FREE FOR GAS CONSUMERS ON THE DISTRICT.

The PRESIDENT said the next item on the programme was what should prove a particularly interesting discussion; the subject being "What is Done Free for Gas Consumers on the District." Several members had promised to take part in it; and he did not think he could do better than call upon them in alphabetical order.

Mr. C. M. D. BELTON, Engineer, Manager, and Secretary of the Shrewsbury Gas Light Company.

SERVICE PIPES.

Work done upon mains and services up to, and including, the meter is the gas undertaking's direct responsibility, and therefore does not strictly come within the scope of the subject under discussion. However, it may be just as well to mention that a not inconsiderable expense is being incurred owing to lack of foresight in years gone by, whereby small-bore service pipes were laid, evidently without anticipation of much development in the use of gas in small houses.

In our case, whenever an old service pipe is uncovered for repair, a larger size is substituted, according to the consumer's prospective consumption. In one district particularly, where complaints were far too frequent, a large number of ½-in. services were found; and these are being systematically replaced by pipes commensurate with the requirements of the houses. But, owing to the pipes being covered by paved yards and paths, the cost in this area has averaged £5 per house. Nevertheless, consumers have appreciated the improved supply; and we have no doubt that extended use of gas will follow, though there is often some complaint when a larger meter is fixed, and consequently a higher rent is charged.

FITTING-UP OF NEW HOUSES.

In connection with the fitting-up of new houses, we offer free carcassing when the builder or owner agrees to instal gas for three of the four purposes—lighting, heating, cooking, and hot water. This has proved an attractive proposition to many; but our chief difficulty is to persuade the speculative builder to instal any gas

appliances whatever, except perhaps the wash-boiler. The cheapest of coal grates must go into the bedrooms; and the tenant must find the other appliances. Where the house is being built for an owner-occupier, the case is somewhat different, and we are able to secure a hearing, generally followed by a satisfactory order. Where the order is sufficient to embrace the free carcassing offer, the small amount of excess service pipe beyond the statutory length is usually included.

Simple Hire.

Certain types of cookers, fires, radiators, and cast-iron water boilers are let on the simple hire system, a standard charge being made for fixing—5s. where a pipe exists, and 10s. where a pipe has to be run. The limit of length for this charge is 25 ft. This arrangement constitutes a partially free service to the consumer, as the nominal charge does not cover the actual cost of the work in the majority of cases. Nevertheless, we have found that it is of material assistance in securing orders, because, when choosing their stoves, consumers usually want to know at once what it will cost to fix, and for single pieces the call of the inspector for survey and quotation is obviated.

Maintenance.

Maintenance of apparatus on simple hire is at present carried out only at the request of the consumer, except in the case of radiators, which are regularly overhauled at the beginning of the season, free of charge. We should like to include a similar inspection of all gas fires twice during the season; but the size of the staff is insufficient for this at present. Of course, this free maintenance, when called for, includes the standard slot installations.

New hotplates are now being fitted to certain old types of small cookers on hire; this work being undertaken systematically, one pattern at a time. The cost of repairs to hired apparatus during the last five years has amounted to 1·67d. per 1000 c.ft. of gas, or 0·36d. per therm, sold.

Burner maintenance is undertaken at the price of 1d. per burner per monthly visit; all material being charged for as and when required. Those who have come into this scheme have been retained; but we have not been very successful in extending its adoption. At present, 4300 burners are attended to, at a cost of approximately 1¾d. per burner for labour. Hence this may be called a partially free service.

A system of general maintenance has been started, and all the consumers in the Company's area have been visited once. The fitters chosen for this work are given a card of introduction to assist them in gaining admittance, and are instructed to make a record of all appliances found in each house, effect adjustments and repairs where necessary, suggest improvements, and take orders for new or additional apparatus. No charge is made to the consumer for labour or for parts required for renewal of hired appliances; but any other material is charged at current rates. The cost of the work for the first round averaged 7s. 9d. per consumer; but subsequent visits will cost substantially less, as we found a great deal of work necessary which would not accrue except over a number of years.

The PRESIDENT said the next gentleman on the list of those who had promised to join in the discussion was Col. G. S. Eunson; but unfortunately he was unable to be present. Mr. Banks would, however, tell them something of what was done at Northampton.

Mr. H. BANKS, Northampton.

Arrangement with Builders.

I have been asked by Col. Eunson to apologize to the meeting for his enforced absence. In his stead, I will, with your permission, give you a few figures with regard to what we are doing at Northampton. We commence with the builder, and our present arrangement is to pay 4s. a point for all points put in new houses. We have had this arrangement in operation for eleven years. We started with 2s. 6d. a point; but about 1920 we found that this was not adequate. During the past three years, the arrangement has cost the Company an average of £510 per annum—equal to slightly under ½d. per 1000 c.ft. of gas. This 4s. is only paid on condition that the Company's specification for pipes throughout the house is complied with, and also that all pipes are open for inspection by the Company's representative before the completion of the work. The sizes of pipes under the specification are sufficiently large to allow for additional fires, should they be at any time required.

Extensions to Villages.

We have another arrangement in connection with extensions to surrounding villages. During the past four years the Company have extended the supply to about five villages; and in these cases, where orders are obtained and work completed before the mains are taken out to the villages, free labour is given.

Inspection and Maintenance.

With regard to hired apparatus, this is all subject to an annual inspection and free maintenance. In the case of prepayment consumers, where stoves have been fitted to existing pipes, and the pipes are found inadequate, a free run is taken from the meter to the cooker. We have now commenced a periodical inspection of fittings; and in cases where they are found to be in a very bad condition, the inspectors' instructions are to persuade the consumer to put in new fittings. If they are not able to obtain the cost of these fittings, the Company put one or two in free—where the old ones are in a dangerous condition only. We have found quite a number of fittings that have been patched up with red lead and soap, and which we consider it pays the Company well to replace.

Mr. A. W. SMITH, General Manager and Secretary of the Birmingham Corporation Gas Department.

In my opinion, the proper answer to the question, "What is done free for gas consumers?" is, "Nothing." Obviously, nothing is done free; the difference is only in the method of charge. That is why I took the stand on a former occasion that one should be extremely careful as to what services one performs without direct charge to the consumer, in order to be fair to the various different classes of gas users. In Birmingham we have 124,000 automatic consumers who take an average of 28,000 c.ft. of gas per annum; we have 96,000 ordinary consumers, whose consumption averages 59,000 c.ft. per annum; and we have 3600 manufacturer consumers—that is, customers who have meters on the reading of which they are charged the manufacturing rate for gas—whose average yearly consumption amounts to 1,016,000 c.ft. These figures show how necessary it is that careful thought should be given to all aspects of the case before any offer is made to fix or maintain apparatus "free." The cost of all work done without charge or at nominal rates must ultimately fall upon the cost of gas. No consumer will have grounds for complaint if any service you offer "free" is available and useful to the bulk of consumers in proportion to their consumption. For instance, if a meter is supplied and no meter rent charged, the capital cost of the meter becomes a charge on the general cost of gas; but as the cost of supplying the meter will be roughly in proportion to the amount of gas a consumer requires, no injustice is done if meter charges are omitted.

In the endeavour to systematize the subject a little, we cannot, perhaps, do better than divide it into four sub-divisions:

(1) Services and piping in new property.
(2) Fixing and hire charges for apparatus.
(3) Maintenance of apparatus.
(4) Treatment of the automatic consumer.

Services and Piping in New Property.

We all realize how vital it is that we should get adequate gas supply pipes into all new properties, and know of many cases where engineers, in their anxiety to secure this business, have agreed on laying services free. This, I think, is wrong. The essence of business is a mutual bargain; and it is a good rule not to give anything without something definite in return. In Birmingham we have no regulations or by-laws as to what size pipes shall be put into buildings; but we have done extremely well by striking a bargain with the individual builder. Normally, we charge for all private service up to the meter; but we have drawn up a specification—or rather a series of specifications—applicable to different types of houses, and we say to the builder; "Now, if you will fit-up your houses in accordance with our specifications of pipe sizes and positions, we will lay so many feet of private service free." Where gas is installed for lighting and heating, 30 ft. of private service is run free; if for heating only, 20 ft.; and so on. This gives us a hold over the builder; while he feels that he is really taking part in a business transaction, and we find him quite ready to do his share and to hold us to our bargain. You have, here at any rate, a good basis for negotiation, and one steers clear of giving "something for nothing." It is only too true that "what is got for nothing is never appreciated." It is extremely unlikely that builders will put-up houses with no gas supply pipes whatever; and with our "sprat" of free service, we catch the "mackerel" of adequate supply pipes, fire positions, &c. Quite 95 p.ct. of the houses built comply with our specifications.

Fixing and Hire Charges for Apparatus.

When we come to the question of the fixing of various types of apparatus, we have to remember that present-day practice often had its origin in past circumstances. For instance, in Birmingham we have for many years made no charge for fixing gas cookers. Possibly to-day, even if a charge were levied for fixing, it would make little difference to the number of cookers sold; but when this practice was instituted, circumstances were very different. The gas cooker was new and unproved, it had not reached its present perfection; coal was cheap, and domestic labour readily obtainable. All these points militated against the use of the gas cooker; and, in addition, we had the inertia of age-old custom to overcome. With the aid of free fixing, we have installed cookers in over 90 p.ct. of our consumers' houses. To-day our "fixed free" has its advertising value, and is not costly. We do not run free piping in new houses. Our specification provides for a ¾-in. pipe to the scullery. So long as a pipe is available within a few feet of the cooker position, the cost of fixing is very small. The majority of cookers now sold are for new houses or to replace obsolete patterns in old houses; it is unusual for us to have to run big lengths of supply pipe to cookers nowadays.

When one comes to hot water apparatus, it is very largely a question—as it was with the cooker years ago—of introducing an apparatus into a field in competition with well known and established methods. In Birmingham we run gas supply pipes free to all circulators and geysers, and charge hot water and plumbing work at cost price. I am convinced that the load is worth fostering to this extent, and that the whole question of water heating by gas is in its infancy. A very few years will, I feel sure, see an enormous increase in the number of these appliances in general use. We must look upon this expenditure in the light of publicity for these new types of apparatus.

At this point, I might perhaps digress a little to say that we are still apt to credit the public with a better knowledge of gas appliances than they really possess. The average householder does not know what he can do with gas as a water-heating agent. Geysers, califonts, and circulators are but vague terms to him, and complete mysteries to his wife. It is possible that it might pay us to give demonstrations of water heating in the same way as we now have cookery demonstrations. Certainly it would be a paying proposition to any gas undertaking which has a permanent lecture room available.

Reverting once more to our free gas supply to such apparatus, I may say that our usual profit is added to the price of such appliances; and this goes a long way towards covering the cost of installation. So that on the average no actual charge comes upon gas from this work.

Passing on to the fixing of gas fires, I may say that we have for the past few years adopted a practice which is interesting, and is serving its purpose admirably. During the six winter months

from Sept. 30 to March 31, we make a charge of 10s. for fixing, so long as the pipe run is less than 15 ft., with a charge of 2s. per foot for pipe run over 15 ft. During the summer months the charge of 10s. is withdrawn, and we fix free up to 15 ft. of piping. The reason for adopting this course is mainly our desire to distribute the work in the fittings department evenly over the twelve months. If first-quality fitters are to be retained, it is essential that full-time employment be found for them through the twelve months. Anyone who has made a dissection of job costs will admit that jobs on the average take longer when work is slack. There is no incentive for a man to finish a job expeditiously when he knows he has no other work to commence. There is nothing which so tends to reduce the average time taken by fitters as the knowledge that they have other jobs waiting to be done. We are talking of "averages;" and no amount of supervision can cut-out this easing-up in slack periods.

We have found that the remission of this charge does help us enormously in securing a larger volume of work during the summer period. To assist still further in this direction, we make it a rule that if a fire is ordered for fixing during the summer months, no hire charge will be made, or hire-purchase instalments become due, until September—*i.e.*, the quarter ending December. When I tell you that our orders taken for fires during the quarter ended Sept. 30 were 5885, you will agree that the policy has done much to equalize the work of our 293 fitters, and to relieve the rush during the winter months. One has also to remember that during the rush period it is impossible to give our consumers the attention we should wish. Complaints of delay and misunderstanding are certain to arise; and anything that we can do to mitigate the winter stress of work helps to enhance our reputation with our consumers.

I am not going to say anything about our hire charges for apparatus, because these do not represent "free" work for the consumer. All our hire and hire-purchase terms are such that they give us a reasonable interest on the money outstanding. The hiring of appliances on any other terms is economically unsound, and to my mind cannot be defended.

Maintenance of Apparatus.

The maintenance of burners and appliances has been discussed so often, and at such length, that it would be futile to go over much of the ground again. It is obviously worth something to retain one's lighting load; and I do not think any burner maintenance scheme can show a clear balance-sheet. In Birmingham, we make a nominal charge per visit per burner for labour, and charge all materials at ordinary selling price. Even then, I cannot say that we manage to make both ends meet; but we certainly have no intention of saddling ourselves at present with the loss of the many thousands of pounds which some of the disciples of free maintenance would like us to incur.

As regards hired appliances, these we keep in order, and give reasonable replacements to, without charge; the cost of this work being covered by the hire charge. We do not maintain consumers' own apparatus free, but are prepared to do the work on special terms which cover our costs only.

Treatment of the Automatic Consumer.

It would be strange indeed to find two engineers who agreed on all points as to how the automatic consumer should be dealt with, and the load from this source increased. I have no wish to set up our Birmingham practice as a model, though I think we may take a little pride to ourselves from the fact that, according to "Field's Analysis," our consumption per automatic consumer stands higher than that of any other corporation gas department, and is sixth on the list of undertakings quoted for all England. This, at any rate, appears to show that we are on the right lines. Practice to-day incorporates lessons learned from many years' experience; and we consider that by it we have rendered gas available to the smallest consumer without unduly loading the consumption with unremunerative charges.

First as regards automatic services. These are run for a nominal charge of 2s. 6d. for the first 12 ft., so long as the house is fitted-up to our specification. We do not fit-up houses free or at cost, but charge time and material and a reasonable profit for this work. Of course, the landlord is quite at liberty to have the house piped by any master gasfitter; and we only obtain a percentage of the orders for this carcassing work. As some of the landlords of small court and back property find it difficult to pay cash for piping their property, we have a scheme whereby payments may be spread over three, or even five, years. In this connection it is interesting to note what a large amount of small property is owned by people far removed from what is popularly regarded as the "landlord" class.

Once the house is satisfactorily piped, the department are ready to fix meter, cooker, and lighting fittings. Some tenants wish to supply their own fittings or to instal a high-grade cooker. If they do this, then an allowance is made in the feet per penny charged to them. We try to make the difference in the charges for automatic consumers as against quarterly consumers a true reflex of the extra charges borne by us on their behalf. In short, we adopt a reasonable attitude; but we do not wish to spread the idea that they are doing us a favour by burning our gas. It is a case of ordinary commercial bargaining.

Before I sit down, I should like to refer to work which we have been carrying out for the last three summers among our automatic consumers. There is, of course, a slackening of work in the fittings section during the summer months; and the scheme we have adopted serves to keep our fitters fully employed, and at the same time is of vital importance to us. Fittings inspectors visit all old automatic installations and inspect, first, the meter and service, and, secondly, the automatic fittings themselves. If the service is found to be defective, it is renewed free of charge, all brazed tube and defective fittings are replaced, and the installation left in a sound and workmanlike condition. One inverted incandescent burner is fixed free of charge to the consumer, and the cooker is overhauled and its top-plate modernized.

Mr. GEORGE STEVENSON, Engineer, Secretary, and Manager of the Long Eaton Gas Company.

The PRESIDENT remarked that Mr. George Stevenson had promised to contribute to the discussion, but was ill. He had sent a letter, in the course of which he said:

Our district is a very highly competitive one as regards municipal electricity supply; and for many years we have been obliged to adopt progressive methods, probably in advance of the majority of undertakings in the country. The following are some items taken from our daily practice.

Service Pipes.—With regard to service pipes, we lay in wrought-iron steam tube; and we allow from the boundary of private property £1 per service.

Cookers.—These are fixed free at any point decided upon.

Coppers.—The supply is run to position when the house is being built, and plugged up, and fixed free.

Gas Fires.—For many years we adopted a practice of arranging for pipes for gas fires to be laid up to positions when the house was being built, on the principle of "casting bread upon the waters." It is a fact that, when gas fires are fixed after the house is built, there is very great inconvenience, &c., to contend with. On the whole, I am not sure whether our enterprise has been rewarded.

Maintenance.—For many years we have had a complete system of installation and maintenance for Long Eaton. Labour is given free, and cost price is charged for any fittings, &c., used except in cases where special arrangements may be made. This service is greatly appreciated, and, I think, is a far better policy from the Company's point of view than a mere reduction in the price of gas, so that this service cannot be said to be free.

I am sorry to miss this meeting, as I think such discussion can be of great use to the members; and I should be tempted to emphasize the broader aspects of our business—such as inability at present to face the great flexibility which electricity undertakings often use to "clinch" business on special terms. In this district the price for light is 6d. per unit, and for power, even with a 25 p.ct. load factor, 2d. per unit; but for heating and cooking, which may be only a 1 p.ct. load factor, it is 1d. per unit. The last-named price is, of course, not based on the ascertained cost to the undertaking, but is meant to induce this particular class of business.

I find in an industrial district that the cost of gas for regular use for heating of 9d. per therm, less 10 p.ct. and 12 p.ct., is too high; and some method will have to be devised by means of differential tariffs for the successful prosecution of this line of business.

The PRESIDENT said it was a pity that the time at disposal had so nearly run out; for the subject would provide good material for a full afternoon's discussion. It seemed to him that the matter was one of local psychology; and certainly, so far as the district with which he was connected was concerned, so-called free service was an enormous attraction. The line they should mainly go on was to charge an adequate price for their gas and include in the price of the things they sold and in the price of the gas as much free service as was possible. The price of gas must be scietifically graded. This was most important. It was doubtless the case that labour was not adequate for complete and universal maintenance; nevertheless, it was a good thing that they should make a start on the maintenance of appliances, if it was only for those people who were quite incapable of looking after their own.

NEW COKE OVENS AT ROTHERHAM.

Important developments are in hand at the coking plant of the Rotherham Main Colliery, which is owned by Messrs. John Brown & Co., Ltd. A contract has been given to Messrs. Simon-Carves, Ltd., for the erection of a coking plant to replace two existing batteries of 30 and 35 ovens (waste-heat type), which were started in 1902 and 1904 respectively, and have since been in continuous operation.

The new battery will consist of 28 regenerative "underjet" ovens of the latest type, and be designed to carbonize 3000 tons of washed slack per week. The battery will be equipped with the most modern machinery for charging the coal into the ovens and for discharging and subsequently handling the coke. Included in this equipment will be a reinforced concrete coal hopper of 1000 tons capacity, with elevating and crushing plant, an electrically driven lorry for charging the ovens, and an electrically operated combined ram and levelling machine for discharging the coke and levelling the coal charge in the ovens.

The coke handling plant will consist of a coke car running on a railway track in front of the ovens, with electric locomotive haulage, central coke quenching station, where the hot coke in the car is quenched *en masse*, and an inclined reinforced concrete wharf on which the quenched coke is dumped from the car and from which it is subsequently fed by mechanical means on to a rubber band conveyor to a screening plant.

The screening plant is designed on the most up-to-date lines to separate the large coke from the fines; and embodied in it is a breaking and subsidiary screening plant for the production of small sized coke for domestic central heating, &c.

In addition to the new installation of coke ovens, the contract obtained by Messrs. Simon-Carves, Ltd., includes the remodelling and replacement of the existing bye-product recovery and treatment plants, so that the whole plant as finally completed will be thoroughly up-to-date and efficient.

"Coal in Great Britain."—This is the title of a book by Dr. Walcot Gibson, F.R.S., published by Edward Arnold & Co., at 21s. net. This is the second edition of the volume; the first edition having been published in 1920.

THE ELECTRIC GRID.

[Reproduced from the "Electrical Times," through the courtesy of the Editor.]

THE MAIN LINES OF THE ELECTRICAL GRID, EXCLUDING THE SECONDARY ONES.

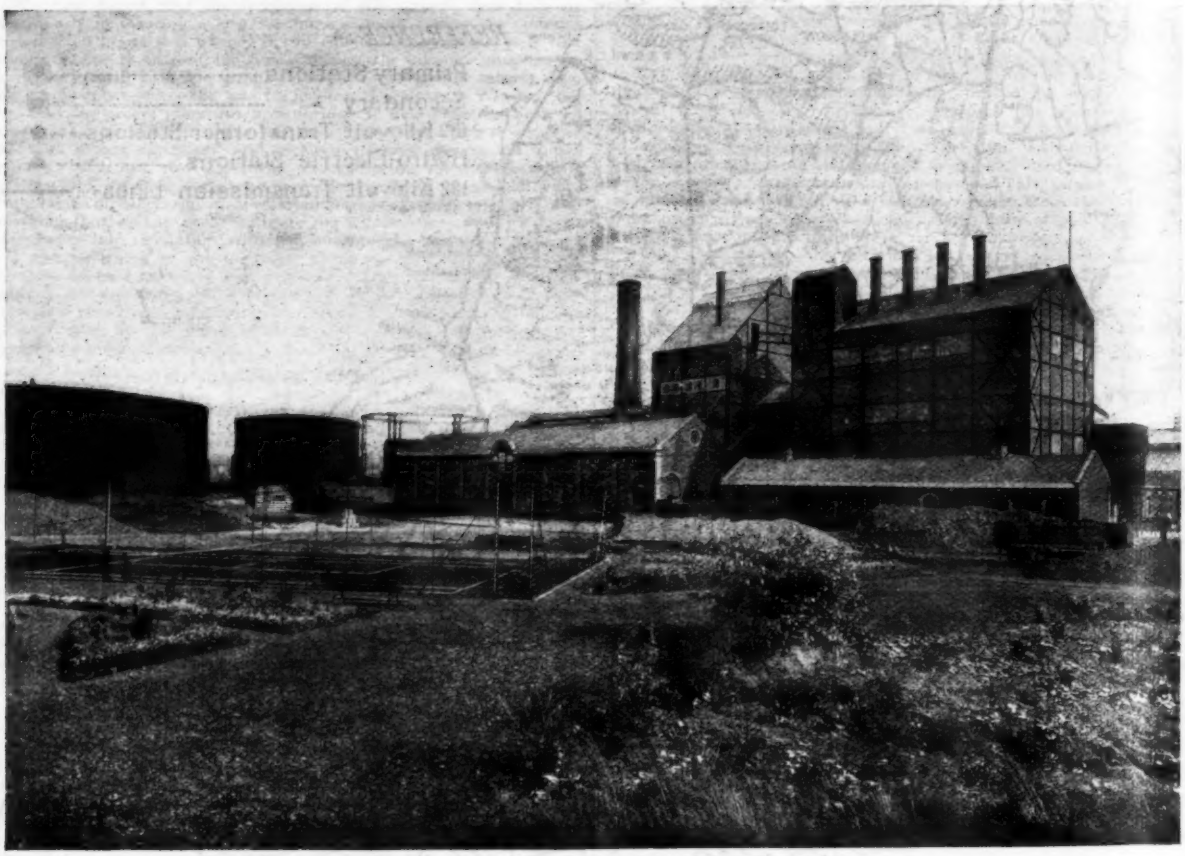
(Two or three hydro-electric stations in the extreme North are outside this map.)

At the present stage of the development of the national generation and transmission scheme, the route of the lines must be taken to be merely approximate. The map accompanied the Presidential Address of Mr. Archibald Page to the Institution of Electrical Engineers. The President is Chief Engineer to the Central Electricity Board.

GLOVER-WEST VERTICAL RETORT INSTALLATIONS AT COATBRIDGE.

AN OFFICIAL INSPECTION.

The gas industry both in Scotland and England was numerously represented at a function held in Coatbridge on Friday last. The occasion was the official inauguration and inspection of the Glover-West vertical retort installations at the works of the Coatbridge Gas Company—an installation, by the way, which is expected to increase the Company's productive capacity by 50 p.ct. The first installation of Glover-West verticals at the works was made in 1921; and a second installation has now been brought into operation. At noon, the Chairman of the Company (Mr. Alex. S. Legat) formally set in motion the second installation; while Alderman F. J. West, C.B.E., J.P. (ex-Lord Mayor of Manchester), gave a brief explanatory statement of the main features of the scheme.



VIEW OF THE COATBRIDGE GAS-WORKS.

THE CARBONIZING PLANT.

In 1921 Glover-West vertical retorts took the place of the old hand-charged horizontals. This first installation of Glover-West retorts comprises a bench of four settings, 32 retorts in all, with an encircling gravity bucket conveyor for handling coal and coke, a battery of coke storage hoppers erected between the retort house and the railway line in the yard, and an auxiliary 100-ton coal storage hopper erected at the coal plant end of the house. The retorts of this installation are of the elliptical 33 in. by 10 in. model, approximately 21 ft. long, arranged in units of four; the nominal carbonizing capacity of each retort being 3 tons per day.

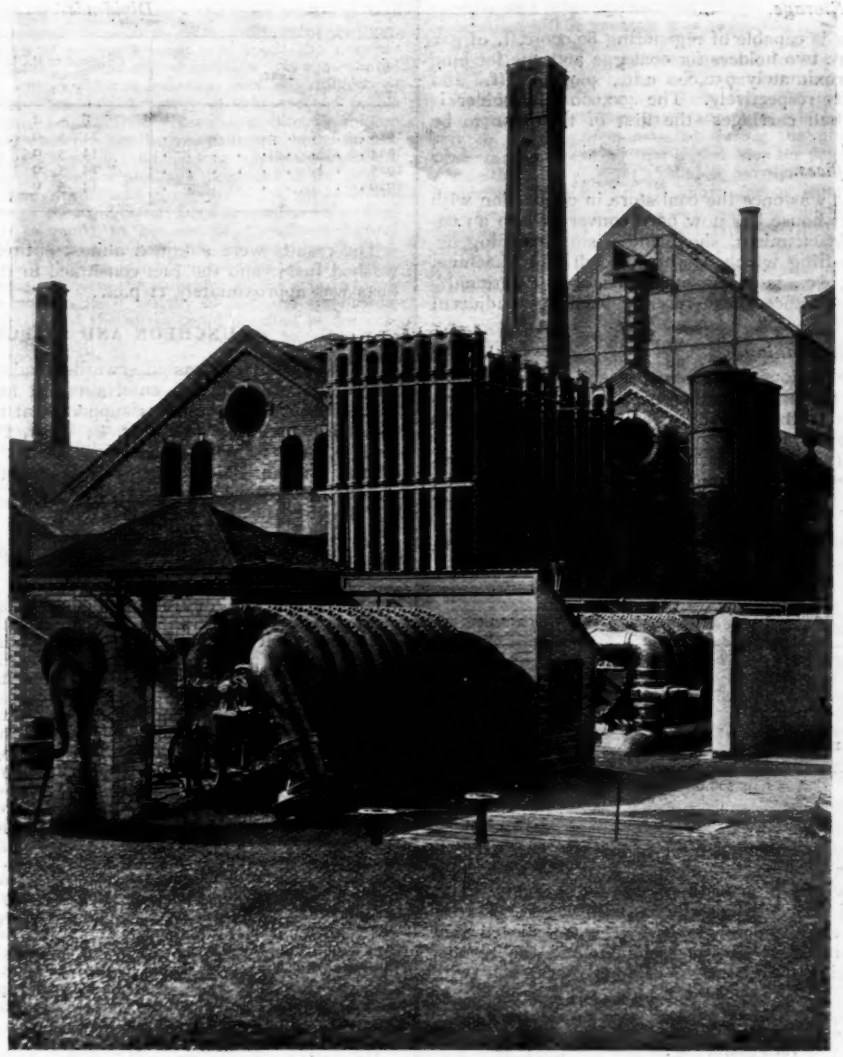
To satisfy the constantly growing demand for gas, it became necessary to extend the manufacturing plant; and a second installation of Glover-West retorts has been built and brought into operation this year. This second installation consists of a bench of eight retorts of the 40 in. by 10 in. model, approximately 25 ft. long, with a total carbonizing capacity of 48 tons per day. The new retort house has been built large enough to accommodate a further setting of eight retorts of the same design, which can be installed at any future time without disturbing the existing plant; while there still remains ample accommodation in the old retort house for further extensions to the carbonizing plant. The producer platform of the first installation is carried across and joins up with that of the second installation; and easy means of access between the two benches is also provided at the top-of-stack level by means of a short staircase.

There are some points of fundamental difference in design between the producer of the second installation and that of the first installation. The grate area per pound of coke consumed, for example, is double that of the older design, so that the gas travels at a much slower speed through the fuel bed, and the temperature of the coke is kept low enough practically to eliminate the formation of clinker. A certain marked advantage in the operating costs of cleaning and clinkering the fires is already apparent; and there is, over the period of operation of the new installation, every indication that some saving in the fuel consumption will accrue. It is also interesting to note that the contour of the grate takes the form of a curve, so that the shortest distance across which the primary air and producer gas travels is through the centre of the fire—not, as in all the older designs, through the top of the fire. Because of this, whatever clinker there is occurs, not at the top of the grate, but in the middle of the fire, where there is easy access to it from the floor of the house.

COAL AND COKE HANDLING PLANT.

The railway wagons are up-ended above the coal receiving hopper, and emptied of coal by either of two hydraulic wagon tippers; and a reciprocating feeder tray is provided at the outlet of the receiving hopper to regulate the flow of coal into the four-roll coal breaker. A by-pass shoot is arranged so that washed nuts may be fed into the boot of the elevator without the coal having to pass through the breaker. From the underground pit, the coal is picked-up by a fixed-bucket elevator, which discharges into the auxiliary 100-ton coal storage hopper; and from this hopper the coal is taken out at any convenient time during the day and transported to the overhead main bunkers of the vertical retort plant by means of the encircling gravity bucket conveyor. By this arrangement, the coal can be emptied from the railway wagons by the hydraulic rams, broken, elevated, and stored in the auxiliary coal hopper without a halt; the coal remaining there until the encircling gravity bucket conveyor, which also handles the coke from the bench, is free to handle it to the overhead bunkers above the bench.

The coal for the second installation comes from the railway wagons to the auxiliary coal hopper in the manner already de-



CONDENSING, WASHING, AND SCRUBBING PLANT.

scribed, the handling plant up to this point being common to both plants; and from a pocket within the auxiliary coal hopper, the coal passes through a shoot into the buckets of the encircling lip-bucket conveyor, which transports the coal to the overhead storage bunkers of the bench.

The coke from the retorts of the first installation is picked-up by the gravity bucket conveyor underneath the floor of the retort house, suitable fillers being provided to prevent excess spillage between the buckets; and the coke is elevated and discharged through the inclined shoot which leads out to a bar screen erected above the coke hoppers. From these the coke is discharged direct into the railway wagons.

The coke from the retorts of the second installation is handled in a similar manner out to a mechanically operated coke screen erected above the No. 2 battery of coke hoppers; but there is a radical difference in the design of the two encircling conveyors—the No. 2 conveyor being of the West lip-bucket design, which is the latest development of mechanically handling coke from the retort house.

OTHER PORTIONS OF THE WORKS.

Sulphate of Ammonia Manufacture.

Recently re-erected in what was the original purifier house, the sulphate making apparatus consists of two complete distillation plants, each capable of a daily output of 30 cwt. of sulphate. The salt is partially dried in a centrifugal machine, elevated by an electric lift, and finally dropped from a height on to a drying floor, the first part of which is heated by closed steam pipes carrying the exhaust steam from the engines under the floor. The salt is ejected from the saturator by means of air, neutralized, freed from lumps, and finally elevated by a worm conveyor to the bagging floor and store. From the store the material may be run direct into railway vans; and, in order to make the plant completely self-contained, a Spencer-Bonecourt gas-fired boiler is being installed.

A yield of 36·5 lbs. of sulphate of ammonia per ton of coal carbonized is obtained.

Auxiliary Plant.

Continuous current of 220 volts is used for coal breaking, coal and coke elevating and conveying, operating the lift, and for lighting the plant and works. The current is generated by means of two 44-B.H.P. gas engines direct coupled to 30-KW. generators. In order to avoid complete dependence on electric power and to ensure adequately against breakdown, a stand-by to the motor which drives the lip-bucket conveyor is provided in the form of a steam engine; and the extractors are driven by two gas engines.

It became necessary to instal a 400,000 c.ft. capacity Humphreys & Glasgow water gas plant to operate in conjunction with the horizontal retorts. This plant is arranged for the provision of an oil carburettor; and this may be added at an early date, in order that the plant may be of assistance at times when it might not be desirable or economical to light-up from cold an additional bed of verticals.

The condensing plant consists of atmospheric condensers capable of dealing with 1,500,000 c.ft. of gas per diem. There are two Waller exhausters driven by horizontal steam engines, each a stand-by to the other, and each capable of dealing with 80,000 c.ft. of gas per hour. Two Livesey washers, twin tower scrubbers, and two Holmes rotary scrubbers complete the washing plant; the system being capable of dealing with 2 million c.ft. of gas per diem.

Purifiers.

It is interesting to note that during a considerable period of the year 1909 gas manufacture was carried on uninterruptedly at Coatbridge without purifiers. The purifiers had been completely destroyed by an explosion; and as a temporary expedient, the gas was purified by means of milk of lime pumped through the tower scrubbers. The method adopted was fairly successful, and continued until a set of wooden boxes had been rushed up. Subsequently a set of purifiers of the luteless type was erected by the Whessoe Foundry Company.

Station Meter and Storage.

The station meter is capable of registering 80,000 c.ft. of gas per hour. There are two holders for coal gas and one for blue water gas, of approximately 750,000 c.ft., 400,000 c.ft., and 250,000 c.ft. capacity respectively. The 400,000 c.ft. holder is fitted with patent ball carriages—the first of this type to be erected in Scotland.

Workshops and Offices.

A portion of what was once the coal store in connection with the horizontal retort house has now been converted into an engineering shop, a blacksmiths' shop, and a stove-cleaning department. The shafting which operates the drilling machine, screwing machines, &c., is driven by means of a "National" gas engine. Modern offices have recently been built adjacent to the works.

Progress of the Undertaking.

To carry out the various improvements and the extensions which had become necessary, further capital was naturally required. The present authorized share capital is £144,650, with borrowing powers of £72,325.

The Gas Regulation Act of 1920 was adopted by the Company in 1921, when they declared a quality of 450 B.Th.U. The present quality is 475 B.Th.U., and the price 8·4d. per therm.

The growth of the undertaking will be seen from the following figures:

—	Share and Loan Capital Issued.	Consumers.	Production.
1877	£44,650	3,500	41 million c.ft.
1887	46,650	4,080	58 ,, ,,
1897	49,650	5,449	93 ,, ,,
1907	87,376	9,143	180 ,, ,,
1917	96,141	10,204	289 ,, ,,
1927	170,875	10,933	*298 ,, ,,

* = 1,415,500 therms.

WORKING RESULTS.

Before the erection of vertical retorts, the horizontal retorts were operated in a fashion intended to give gas of a good quality, combined with a high yield of residual products. This object was achieved very satisfactorily for many years. On the erection of the vertical retorts in 1921, it was believed that these could be operated in similar fashion; and the results, practical and financial, over a period of four years show with what success.

Year.	Total Cost of Coal.	Return from Sale of Residuals.
1923	£19,524	£21,110
1924	25,524	26,586
1925	24,492	24,026
1926	19,344	17,565
Total	£88,884	£89,287

These figures show that on the average the financial return from coke, tar, and sulphate of ammonia more than met the cost of coal.

The quantity and weights of residuals sold per ton of coal carbonized to obtain the foregoing financial returns are shown below:

Year.	Coke.	Tar.	Sulphate of Ammonia.
	Cwt.	Galls.	Lbs.
1923	8·90	18·78	44·60
1924	9·78	18 33	40·93
1925	9·78	18·27	40·69
1926	9·32	18·57	40·28
Average .	9·44	18·48	41 62

Along with the aforementioned figures, the following yields of gas per ton were obtained:

Year.	Therms per Ton.	Year.	Therms per Ton.
1923	68·29	1925	65 39
1924	66·90	1926	67·70

The selling price per therm and dividend yields over the same period were as follows:

Selling Price per Therm.

Year.	Price per Therm.	Year.	Price per Therm.
	d.		d.
1923	7·0	1925	7·0
1924	7·0	1926	8·4

Dividends.

Year.	Original 10 P.Ct. Stock. P.Ct.	New 7 P.Ct. Shares. P.Ct.
	£ s. d.	£ s. d.
1923	14 5 0	9 19 6
1924	14 5 0	9 19 6
1925	14 5 0	9 19 6
1926	14 5 0	9 19 6

The results were obtained almost entirely from Lanarkshire washed fuel; and the fuel consumed in the heating of the retorts was approximately 11 p.ct.

LUNCHEON AND SPEECHES.

An adjournment was afterwards made to the Town Hall, where the visitors were entertained at luncheon. Mr. ALEX. S. LEGAT presided, and was supported at the head of the table by Alderman F. J. West, Mr. E. West, Provost Smith (Coatbridge), Provost Armour (Airdrie), Mr. W. M. Mason (Manager of the British Commercial Gas Association), Messrs. J. E. Blundell, R. Glover, and J. D. Miller.

Following the toast of "The King,"

Alderman F. J. WEST proposed "The Coatbridge Gas Company," coupled with the name of the Chairman. He felt sure all those present would join with him in extending hearty congratulations to the Chairman and Directors of the Company on the evidence which everyone had seen that day of enterprise in the development of the undertaking. It was evident that the Board were bent on doing everything they possibly could for the industrial and commercial life of the town. This gathering, too, afforded them an opportunity of offering a tribute to Mr. George Braidwood and the staff under his control. It was interesting to note that the inauguration of the new plant coincided with the jubilee of the incorporated Coatbridge Gas Company. The Directors, at their meeting on the previous day, had fittingly recognized the occasion, for they presented Mr. Braidwood with a gold watch. Mr. W. F. Anderson (the Secretary) had also been remembered; while the workmen were all the recipients of a handsome bonus in celebration of the jubilee. It was rather an extraordinary coincidence that fifty years ago this same Company should have presented their then Manager, Mr. Robert Mitchell, with a gold watch. Proceeding, Alderman West emphatically denied that the manufacture of gas was a waning industry. It ought to be kept in mind that the output of the gas undertakings of this country had increased by 66 p.ct. in the last 20 years. Not only so, but during that period the customers—who now numbered something like nine millions—had increased by 62 p.ct. The capital involved was about £160,000,000, and more than 100,000 workpeople were employed. The Coatbridge Gas Company formed an excellent example of the progress and development of the industry. In the last 30 years they had actually trebled their output.

Mr. LEGAT, acknowledging the toast, said that the old Coatbridge Gas Light Company was formed as the result of a meeting held in 1842; but by 1877 the demand for gas had so increased that it was deemed expedient to improve and extend the works. Hence the present Company were constituted and incorporated, and had now just completed their fiftieth, or jubilee, year. In 1914 the Company resolved to instal vertical retorts; and they had almost completed a contract when war broke out, and negotiations had perforce to be broken off. However, in 1921 they resolved to adopt the Glover-West system; and they were now inaugurating an addition to this installation which he understood was the first of its type at least in Scotland, and would increase their producing capacity by some 50 p.ct. The Company were proud of the fact that during the coal stoppage of last year they did not carbonize a single ton of foreign coal. It had been necessary to raise the price of gas 6d. per 1000 c.ft., but only for three quarters, at the end of which time they were able to reduce it to the pre-strike price. He felt that the future of the gas industry was a bright one; and the extension of plant which they had just inspected showed that this also was his Company's view. Continuing, the Chairman said: "I think I should err in speaking of the Coatbridge Gas Company if I did not say that no doubt much of its success is due to the fact that it has generally been blessed with good management and an efficient staff. In our present Manager we have a man who is well known to many of you, and who is making a name for himself in the gas world. He, as you may have observed, has thriven on Coatbridge gas; and his shadow does not grow less. As well as bodily growth, however, he has also grown mentally, as was natural, and has acquired a good deal of knowledge since he came to us; the result being that the works you have visited to-day are in large measure due to his advice and engineering ability. Our Secretary and Treasurer does not come so much into the picture; but behind the scenes he does good work in the clerical and financial departments. While he has not thriven in like manner as the Manager, he may still hope; but it remains true in the meantime that sometimes, as in his case, 'Guid gear gaes intae sma' buik.' We have also a loyal and anxious general staff, quite a number of whom have been from 20 up to 45 years in the service of the Company, thus I think showing that the good feeling between employer and employed, which is at present so much spoken about, is here well in evidence. I can see no reason why, if the parties could only be left alone and free from outside influences and interferences, which unfortunately are not always disinterested, we should not have that peace in industry which would lead to a revival of the trade of this country, and give us a better chance to compete with the foreigner."

Judge W. J. HARVEY proposed "The Town and Trade of Coatbridge," which was acknowledged by Provost SMITH.

Thereafter Mr. W. M. MASON, proposing the toast of "The Gas Industry," gave some remarkable figures as to the present position. He thought that, in view of so much loose talk about the wonders of electricity, the following facts—not theoretical visions—should be broadcast: In the century-old gas industry, over 160 millions of capital was profitably invested, and an army of over 100,000 people found regular and happy employment. Something like 8¼ million customers were served, and practically every decent home in the land had some sort of gas cooking and heating appliance installed. One large undertaking in London annually produced more energy for the generation of heat, light, and power than the whole of the electrical industry. Over 1000 miles of London streets—including Whitehall, which was reckoned to be one of the finest lighted thoroughfares in the world—were lit with gas. Some 3000 trades—with an average of seven processes in each—depended on gas; while from a public health point of view the influence of the gas industry on the smoke problem was in itself worthy of national commendation. A striking illustration of the effect could be cited in the case of London. Between 1912 and 1924, the soot fall had decreased from 76,000 to 35,000 tons; while in the same period the gas appliances in use had increased from 750,000 to 1,500,000. These were significant figures, and could not be ignored. Undoubtedly, the future of the gas industry was bright, if it secured a fair field and no favour. They looked to increasingly good service, backed by wise salesmanship, with truthful and educative propaganda, to ensure a further era of progress and prosperity in the service of the community. Mr. Mason concluded by congratulating the Coatbridge Gas Company on their enterprise, and commending the zeal of Mr. Braidwood.

Mr. J. E. BLUNDELL (Carlisle) said he esteemed it a great honour to be asked to reply for the gas industry, with the technical work of which it had been a pleasure to have been associated from early days. On behalf of the industry, he thanked them heartily for the kind wishes for its success, and for the cordial manner in which these had been endorsed. He would like to pay a tribute to his friend Mr. Braidwood. They had seen that day something of the man reflected in his most excellent works. Mr. Braidwood, as they in Scotland knew, had taken his work seriously. They remembered his paper at the North British Association spring meeting in 1921 on "Notes and Comments on the Therm;" also that valuable contribution "Ammonia Yields from Vertical Retorts," which he read at the Institution's meeting at Belfast in 1923. These communications contained a store-house of information useful to the gas industry. Mr. Braidwood was a man of fixed purpose who knew what he wanted, and ultimately got it. He (the speaker) was reminded of the history of the little boy who went to Sunday School for the first time. The day happened to coincide with the visit of the vicar, who, seeing a new boy, placed his hands on the little chap's head, and said, "Well, my boy, and what do you expect to learn to-day?" Smartly came the reply, "Please, sir, the date of the picnic." It was to such men as Mr. Braidwood that the gas industry owed its success.

The gas industry had indeed enjoyed remarkable success. The plant, in the inauguration of which they had taken part that day, was only one of many testimonials to the success which had been achieved. In itself it was an indication of the determination of the men responsible for the gas industry that the path of success should continue to be pursued. It might be of interest to them if he referred to a recent address of the Chairman of the London Section of the Society of Chemical Industry—Mr. W. J. A. Butterfield, M.A., who was one of the Gas Referees responsible for the organized official testing of gas throughout the country. In that address he pointed out the important part that the gas industry took, not only in their national system as suppliers of an important public necessity, but in the sustenance of other industries by the supply to them of raw materials which they required, and which were the products of coal carbonization. Mr. Butterfield had also instanced how, in respect of its primary product, the gas industry had increased its rate of progress since the first Electricity Supply Act was passed by Parliament. This was passed 45 years ago—in 1882. Mr. Butterfield had pointed out that in the first fifteen years of that period (1883-97) the sales of gas increased each year on the average by 3618 million c.ft. In the next fifteen years (1898-1912) the average annual increase rose to as nearly as possible 5000 million c.ft.; while in the last fourteen years (1913-26), the average increase per annum was no less than 5892 million c.ft.—and this last figure would have been much more had it not been for the war and the great depression in their industries. This magnificent increase upon increase had been made despite the keenest of competition from their not-to-be-despised competitors. What had produced this great progress? It would never have been made had the gas industry stood still in its economies and efficiencies. It was due to such plants as the Glover-West that higher efficiencies per ton of coal carbonized had been obtained, higher efficiencies throughout the whole process of carbonization, and therefore economies which had tended to reduce the cost of production, and thus to lower charges to the consumers.

He (the speaker) almost trembled to think what would have been the condition of the industry had it stood still in its work from the 'eighties with the costs of material and labour at the point at which they were to-day. Supplementing the great efficiencies and economies which had been realized in manufacture, they had the efficiencies and economies which had been realized in their modes of applying the primary commodity. In lighting, heating, cooking, power, and other industrial processes, utilization efficiency had been progressively brought into account. Therefore, combining the efficiencies and economies which had been secured in manufacture and in application, they found the secret of the success which had attended the operations of the gas industry, despite the tax of high-priced materials and labour, and the competition of an energetic rival. What the gas industry had done in the past, it was minded to do in the future.

Research was going forward within the works of gas undertakings, within the establishments of their manufacturers, and in the universities and other learned institutions with which the industry had association. The outlook was promising; and they who lived so much behind the scenes in these matters foresaw greater services to the community, to its individual and collective benefit. They were all anxious to save labour in the home; they were all desirous of greater atmospheric purity. And in these directions the gas industry was working well, and with reliability, which was, he ventured to say, so worthily demonstrated during the great coal stoppage of 1926. Not only, during that period, was the supply of gas maintained when other fuel was not available, but they had the authority of Mr. Butterfield, with his official knowledge of what actually took place, that over 70 p.ct. of the gas which was officially tested during the great stoppage was maintained unimpaired throughout. Only 20 p.ct. showed an average deficiency of less than 5 p.ct., and only 10 p.ct. sold in any quarter of that troublesome year was more than 5 p.ct. lower in average calorific value than it would have been in normal times. He thought the figures he had quoted were ones of which they had reason to be proud; and he was confident that, in the time to come, the gas industry would have occasion to be prouder still of its accomplishments. The gas industry could not stand still; it had either to go forward or slip backwards. If they were to have continued prosperity in the industry, those responsible for its administration must be men of vision, men who kept abreast with the times, men prepared and equipped for changing conditions; and as he looked about him he felt full of confidence for the future—knowing that not only had they the men, but that these men possessed the individual driving force that must succeed.

Mr. JOHN D. MILLER proposed "The Contractors," and in doing so remarked that West's Gas Improvement Company had made themselves famous throughout the gas world. It was a firm that had become favourably known to the Coatbridge Gas Company because of the excellent services they had rendered in providing them a few years ago with a splendid carbonizing plant. Speaking as a Director of the Gas Company, he might say that that plant had now been in operation for over six years, and had worked to perfection. The results obtained from it had surpassed the most sanguine expectations of the Directors. For the success of the extension, they were indebted to the contractors on the one hand, and to Mr. Braidwood on the other. If the new plant which had been inaugurated that day gave the same good account of itself as the first installation had done, then the Coatbridge Gas Company would be more than satisfied, and the reputation of the contractors would be further enhanced.

Mr. ERNEST WEST, replying, congratulated Mr. Braidwood on the excellent results he had obtained at Coatbridge. He had acquired most valuable experience, which had proved to be a great benefit to the Company. He had to thank Mr. Braidwood and his staff for the courtesy they had shown to the Glover-West operatives and staff. They had mutually helped each other; and he felt confident that the new plant, in the capable hands of the Manager, would prove of valuable use to the Company. He wished to present to the Chairman a piece of silver plate, as a memento of an interesting occasion.

Mr. LEGAT suitably acknowledged the gift, and then called upon Mr. Braidwood for some remarks.

Mr. BRAIDWOOD, who was received with musical honours, said he was grateful for the many kind things that had been uttered about him that day. He felt highly honoured at having the support on this occasion of so many of his brother engineers. The fact that they had turned out in such large numbers was, he considered, a compliment to his Company and to himself. No gas manager could make a success of his works if his Directors were afraid to move with him. His Board in Coatbridge had never been afraid to move; they had backed-up his suggestions in every possible way. So far as the new plant was concerned, he was satisfied they would obtain results which would not disgrace either the Coatbridge Gas Company or West's Gas Improvement Company. Further, the plant would go a long way to attain the desire of the Directors to give complete satisfaction to consumers in the way of a good service of gas at a reasonable price. When referring to the new plant, he must not fail to mention the name of Mr. Poulson. He was a gentleman who was tact personified; and he had done everything humanly possible to make the new plant a success.

Use of Gas in Textile Mills.

According to the "Textile World," textile mills of the United States now rank among the largest consumers of manufactured gas for industrial heat. There are approximately 250 individual mills which use 1,000,000 c.ft., or more, of gas a month each. To furnish the heat needed to singe 1,000,000 yards of cloth, about 75,000 c.ft. of gas are required; and to heat the calender rolls for a million yards, 50,000 c.ft. more. Dyeing, bleaching, and finishing cotton goods are now done with gas heat; and in woollen and worsted mills gas is used for singeing and to supply steam for other processes. One thousand knitting mills now generate their steam mainly with gas fuel. The use of gas for industrial heating goes back only to the beginning of this century. At the present time it is estimated that one-quarter of the country's production of gas is consumed in American industrial plants.

Wales and Monmouthshire Junior Gas Association.—A meeting of the Association will be held at Swansea on Saturday, Nov. 5, when the members will inspect the water gas plant at the Morriston Works of the Swansea Gas Light Company. Following the inspection, Mr. C. S. Thane will read a paper on "Some Mechanical Operations in a Gas-Works—No. I."

RATE STRUCTURE IN THE UNITED STATES.

FROM A REPORT BY THE RATE STRUCTURE COMMITTEE OF THE AMERICAN GAS ASSOCIATION.

In a series of articles published in the "JOURNAL" last August, there were reproduced the contents of a manual on "Better Forms of Rates for Gas" prepared by the Rate Fundamentals Committee of the American Gas Association, with the assistance of Mr. C. S. Reed (Rate Consultant). The subject has been carried farther by a report submitted to the recent convention of the American Gas Association by the Rate Structure Committee, whose Chairman is Mr. Douglas Burnett, of the Consolidated Gas, Electric Light, and Power Company of Baltimore. Some portions of this report (in which it is stated that the industry is rapidly adopting improved rates) are here reproduced. Having already dealt thoroughly with cost analysis on the three and four part principles, the Committee proceed this year to practical rate-making methods—particularly with a view to increasing sales. Special attention is given to rates for industrial gas and water heating, and to inducement forms of rate.

THE COUNTRY-WIDE RATE SITUATION.

The gas industry in this country is moving away from its long-standing practice of doing business on average rates. There is more general classification of rates according to differing conditions of use by classes of customers, and adoption of rates designed to encourage new business in new fields, and intended to maintain and increase sales to existing customers. There is a pronounced tendency towards the adoption of improved rate forms, including those carrying fixed charges and higher rates in the first blocks. Such rate forms induce greater sales by tending to relieve the large user of the burden of making up the deficiency of revenue due to the small unprofitable customers, and aid the industry in expanding and meeting outside competition.

There is a growing conviction that the amount and profitableness of a company's business is basically a matter of good rates, and that the success of all other effort in the way of new business getting, good public service, and good public relations is basically a matter of starting with proper rates. There are many communities served by gas where present rate structures are such as to prevent the obtaining of additional business that would be readily secured were a good rate structure in effect. This new business in sight includes additional gas uses by the domestic customer who now "gets along" with a minimum gas consumption, besides the obvious commercial and industrial utilization.

The work of years by the Committee is bearing fruit. 105 rate schedules in 27 States embody a fixed charge, expressed as such, in the rates for domestic customers. 202 rate schedules in 35 States include a fixed cost in the first few hundred cubic feet. 114 rates in 16 States embody demand charges. 59 rates in 20 States are in three-part form. 36 rates in 11 States are special rates for special classes, with fixed charge embodied or separate. In all, 516 rate schedules in 43 States are based on fixed charge principles. This shows a widespread acceptance of the principles and methods heretofore developed and recommended by the Rate Structure Committee.

ORGANIZING RATE WORK IN A COMPANY.

The Rate Structure Committee recommends that each member company organize its rate work, not only as a matter of personnel, but as a matter of building-up its own individual system of rates—*i.e.*, its rate structure, each rate, schedule of proper form.

It is suggested that each gas company centralize its rate problems, either through charging some person or department with the responsibility, or, in the smaller companies, by engaging a consultant. Primarily the president or general manager interests himself in the situation in his company; but he needs working assistance.

THE WORK OF THE RATEMAKER.

The ratemaker should be at all times in contact with the operating, commercial, and accounting statistics of the business, and with the department heads, besides being familiar with different phases of the development of the community served. He should be sufficiently free from routine duties to enable him to give adequate attention to rate problems.

The duties of the ratemaker are in a way similar to those of a clearing house. In addition to the formality of originating and filing rates, it should be his duty to see that the public and the company employees are familiar with all rate changes; and he should at least be responsible to the extent that all publicity given to rate matters should receive his approval before being given out. All communications to the company in regard to the general subject of rates should pass over his desk. If the ratemaker or the rate department is to function properly, information must be continually collected and available as to the trend of business, operating expenses, average revenue per customer, and other data resulting from rate changes or which indicate that a change of rate is advisable.

RATE CHANGES.

Owing to the well-established nature of the business, the rate problem is usually a matter of changes of existing rates. Changes in rates may be initiated from the desire of the management to accomplish certain objects, from the desire to develop new fields, from the knowledge that such and such a rate plan or business plan is recognized as good practice, from the opportunity that may come to serve a certain desirable class of business or industry, from the conclusions reached from studies of cost of service or the business statistics of the company, from marked changes in cost of major items of expense, from the observation by someone that the trend of certain growths is not satisfactory, from the adoption by the company of the recommendations included in the annual reports of the Rate Structure Committee or of the recommendation of the President and Executive Board of the Association that rate systems be revised according to the principles of the three-part system of costs and rates, or from the action of the Public Service Commission or other public authority.

The motivation of a rate change is thus likely to be either deep-seated or evanescent. Its occurrence may result from either conviction or opinion, or even merely desire. In any case, the company's methods and organization should be responsive to even the mere suggestion of a possibly desirable rate change. Starting thus from even slender beginnings, thorough analysis and investigation should be made so as to result in logical and safe conclusions. Here the technique, experience, accuracy, and good judgment of the ratemaker come into play. The object to be attained should be clearly set up. The different elements of cost and revenue should be listed, analyzed, and reclassified. Test groups of existing customers should be selected, and estimates of the change in cost and revenue prepared. If a class of new business, the field should be surveyed. Each possible solution should be listed and a process of elimination used, to narrow down to the final selection. Related experience elsewhere should be cited, and results compared. Examination of the trend in the same or related lines in the company itself should be made. A forecast should be made and later be checked with results.

Simplicity, limitations of application, and acceptability of the final plan to the customer should be considered. Results, as the study progresses, should be furnished in permanent record form for the information of those concerned. The proposition as finally set up should be briefly and clearly stated, with predicted results, accompanied by supporting data, and also by a statement of the proposition in its business form, ready for final consideration by management, directors, Public Service Commission, or other public authority, and for notice to customers. A standardized method of keeping costs of service and returns on investments by classes of service should be used in each company, and regularly reported. Statistics and data for rate information and for determination of business trends should be kept in a convenient data book or set of charts.

Each case requires individual treatment; many will be simpler than as indicated above—some steps omitted—but there is one right way to go about finding the solution to this vital problem of the determination of rates on which prosperity depends. The greatest care is necessary, as rates once established are often very difficult to withdraw.

CONSUMPTION PER CUSTOMER AND PROSPECTS FOR ITS INCREASE.

It is recommended that gas companies should pay more attention to the consumption per customer in each class, and to efforts towards the increase in sales and net revenue per customer. This is a statistical or index figure that may be watched to advantage, and hence should find its place in the regular income reports or supplementary income reports of the company, so that it may be observed from month to month on a basis comparable with the previous year. It should be reported for each class of business or schedule, and in total. It is an index to the extent of utilization of the investment, and to the effect of rate and other effort in stimulating the growth of the business, class by class. The company that makes the most effort along the lines of proper rate schedules, good service, and good public relations is doing most to increase its consumption and revenue per customer; and the greater the figure, the more the customer is using the investment the company provides for him, and the greater the company's opportunity for profit. Being a key figure, it is a spur to effort.

A method of increasing the consumption per customer in each class is to provide appropriate forms of rate schedules for the different classes of business.

The Committee sounds a warning against placing too great reliance on the consumption per meter in total. Analysis should be made to show this figure by classes; for if a loss in one class

is overcome by a gain in another, that fact would not be disclosed except by the sales analysis advocated by the Committee.

CLASSIFICATION OF RATES, SALES, AND REVENUE.

The Committee feels that improvements in the business of the individual company will result from better and more generally adopted methods of classification of rate schedules, sales, and revenue. Gas companies will find it to their advantage to recognize in their rates the fundamental difference between domestic, commercial, and industrial conditions of use. Not only does experience indicate the desirability of differences in the form of such rates as between the classes, as a matter of dealings with customers, but the differences in load characteristics call for rate differences.

A rate schedule of (say) $1.50 for the first 10,000 c.ft. per month, $1.25 for the next 10,000, &c., as a part of any form, fails to offer any inducement for greater utilization by the ordinary domestic customer using (say) 2500 c.ft. per month, and likewise to the majority of small commercial customers, and results for most customers in practically a straight meter rate. It is the experience of certain gas companies, and the general experience of electric companies, that the incidence of the second or follow-on rate should approximate more nearly the ordinary consumption of a domestic customer, and that he will willingly use greater quantities of gas under those conditions. The greater utilization of gas stimulated by the lower second or follow-on rate keeps the distribution and customer equipment actively passing gas to an increased extent, thus improving the system load factor and reducing average costs.

The form of the rate differs in each class. The rate form that is appropriate for any one class is not appropriate to the others. Demand, for instance, may be largely ignored; as a matter of practicability rather than of correctness in theory, in the residence class, which should have the simplest and most nearly uniform schedule with an inducement feature that comes into play for consumption uses frequently found. In the commercial class, demand is an important feature, as well as load factor; and the form of the rate should encourage additional consumption after reasonable use of the demand. The industrial class requires special consideration of the demand and load factor; and the rates are unquestionably appropriate in form if on a fixed cost and running cost basis, with ample inducement for large use in the form of reduced rates for large consumptions.

Companies often consider it desirable to set-up rates in sub-classes. Thus under the general class of domestic rates, sub-class rates for water heating and house heating have appeared of late in numerous instances. This method adds to the cost of doing business, by requiring separate metering and billing, and deters the customer by requiring separate contract. However, it enables the company to keep separate account of the amount of business of each sub-class.

The domestic rate should be such as to encourage every kind of use for gas, all on the same meter and bill, and should include cooking, water heating, &c., without the necessity of a separate water heating rate. This is especially true where there is any diversification of the loads—it is a matter of better utilizing the investment. The customer should not be limited to fixed kinds of use. The permitted use of gas for any and all purposes should be liberalized, and the customer should be as free as possible to turn to whatever uses of gas he may select. The stage of simplification through universality is thus a step in advance for rate schedules.

With class rates or classified schedules in force, it is but natural to report sales and income separately by classes, and the classified sales and income report at once opens new means of analyzing the growth and status of the various kinds of business, and of watching the relative growth or recession of each class—of controlling the respective new business activities.

BUDGETING OF INCOME.

Forecasts should be made up for each month of the approaching year, and revised quarterly, showing each month's figures as a separate item. It is recommended that the forecasts be made by individual rate schedules; the data for general schedules being prepared by the one who gathers commercial statistics, or the ratemaker, and for industrial schedules by the industrial sales department. Any rate changes made effective should be included as showing revenue changes. Such forecasts should be checked with actual performance.

The consumption per customer (by classes) will be found a useful means of forecasting sales when applied to estimated changes of number of customers; and to this is applied the probable rate to yield probable revenue.

INDUSTRIAL GAS RATES.

In this section of the report, the term "industrial" service and rates refers to that class, small in number, of large users, such as factories.

RATE FORM.

The simple forms of rate suitable to small general consumption are not regarded as appropriate for industrial business. Differentiation of industrial charges is necessary by reason of the wide range of demand and load factor conditions; and for industrial customers the rate should discriminate between good and bad load factor business. A higher average rate is required for poor load factor industrial business than for high load factor industrial business.

We recommend that industrial gas rates take the Hopkinson (or two-part) form, consisting of standing (or fixed or demand) charges and running (or commodity) charges. Compared with the three-part and four-part method of division of costs, the standing charges of the schedule are the same nature as the customer costs, manufacturing demand costs, and distribution demand costs of service; and the running charges of the schedule are of the nature of the commodity costs of service—though in practice the schedule running charges must include the shortage of the other costs not chargeable practically as part of the standing charges in the schedule. To the above extent the recommended form of the rate schedule is compatible with the character of the costs of service; it is a practicable form for rates to take that are based on a four-part cost segregation, when it is not desired to use the more correct four-part rate form.

This recommended two-part form of schedule is suitable for industrial business because manufacturers are accustomed to differences between fixed costs and operating or variable costs. The majority of the revenue is usually collected from the running charges because the amount of the fixed costs of service is less than the operating costs, as shown by the cost of service study. With poor load factor, the fixed cost may be greater than the commodity cost. The rates for the fixed charges, and the proportion of fixed charge billing to total billing are generally lower than the proportion of respective costs, owing to the difficulty in getting acceptance of fixed charges in the schedule to an extent commensurate with the costs. The constant endeavour of the customer is to try to cut down the fixed charge portion of his bill; and industrial sales engineers, who are ever meeting with competitive fuel costs, are under pressure to reduce the fixed charges. The manufacturer says, "I pay for coal by the ton, and for oil by the gallon, likewise gas is a commodity and should be sold by the thousand cubic feet. I should be in position to buy more or less gas according to business requirements, and not have to meet fixed charges." In figuring competitive costs of producer plants and power generation, the industrial customer grants the presence of fixed costs of interest, &c., but he has difficulty in understanding the amount of the fixed costs of the gas business which necessarily include the distribution system, the major part of the investment. The gas company's production being on the largest scale with all the benefits of a diversified load, production costs are lower and fixed costs are higher in proportion than with a local plant. Hence the tendency to call for reductions in the fixed costs of the schedule and the continuous need to make up the shortage in the commodity or running charge part of the rate schedule.

BILLING DEMAND.

Various expedients are sometimes proposed for fixed cost reduction, such as establishing the billing demands for industrial business in the winter months, when the maximum system loads occur, and permitting the summer industrial loads to increase without additional charge. This has the effect of increasing the quotient, the rate per unit of demand, by reducing the divisor, the number of units of demand, that is applied to the dividend, total fixed cost to be collected from the schedule. The burden or overhead cost, in other words, is distributed over less units; and hence the result of decreasing the number of units of fixed costs billed is to increase the unit price of the demand that must appear in the rates. The proposed expedient is faulty to the extent that it raises the price compared with the method of taking the billing demand at the actual maximum load of the customer.

It is also inadvisable to permit frequent redetermination of the demand. One safe method provides that the billing demand, having once been determined, should remain as a fixed factor of billing during a contract term, subject, however, to increase but not decrease—for the reason that it does represent the capacity used by the customer and provided for him by the company, for use during the contract term. The demand should not remain unchecked over any considerable length of time, but neither should it be required that the demand be checked every month. After the expiration of the contract, the demand may be redetermined annually.

24-HOUR DEMAND *v.* HOURLY DEMAND AS A BASIS FOR DEMAND CHARGE IN INDUSTRIAL RATES.

The problem was put up to the Rate Structure Committee to determine whether the 24-hour demand or the short-interval demand—that is, hourly, half-hour, or fifteen-minute demand—was of the greatest importance in the formation of a rate for industrial service provided one or the other basis of demand should be used. Reports of the Committee have shown that in a cost analysis, demand costs should be separated under two heads—the plant demand or 24-hour demand, and the distribution demand or the short-interval demand. Local conditions will indicate which demand should be used as a basis for the demand charge.

GRADATIONS BY STEPS.

The respective rates (fixed charges and running charges) should each be graded downward with increased use. The first

step of fixed charges is highest because it includes the customer cost, and any special additional costs due to the use of special demand metering equipment. A gradation in these steps and in the steps of the running costs will encourage increases in demand and increases in load factor, as well as providing lower rates to meet better the competition of other fuels. The reduction of the successive steps with increased demands and improved load factor is warranted by the reduction in costs per unit of sales due to their distribution over more units sold. The increase in cost of large meters is not as great as the increase in meter capacity. The increased cost of a distribution system for large demands is not in proportion to the loads carried. These are some of the reasons why gas for industrial service can be sold at distinctly lower costs than for the general run of residential and commercial service, and why graduated steps can be introduced in the industrial schedule.

PROFITABLENESS.

The establishment of industrial rates on a proper system, such as that recommended, tends to promote the prosperity of the company. Increased number of customers per mile of main, increased sales per customer, increased proportion of large industrial customers, increased diversity of maximum class loads, increased capacity of mains utilized and proportion of time so utilized, all contribute to the better utilization of the investment and hence the profitableness. Provided, however, that the safety of the rate be always conserved.

DIVERSITY OF LOADS.

The diversity of the industrial load is a factor that specially warrants the closest attention to proper rates for industrial service.

Some recent studies in a large system show that the greatest demand on the distribution system ordinarily occurs as a result of the domestic cooking load on a winter Sunday or holiday when little, if any, industrial load is making a draft on the system. The distribution capacity is thus largely devoted to the requirements of the domestic load. The maximum industrial load on a week day at that time of the year does not occur at the same hour as the domestic load. The maximum daily and monthly use of service by the industrial business usually drops off after October or November, and is lowest in January, when lowest temperatures increase the general load of the system. Such diversities are important considerations in estimating the apportionment of the fixed costs of the business; and the facts as locally determined should be used in the cost of service study on which the industrial rates are based. The effect of diversity is obviously to lower the cost.

FREQUENCY OF COST OF SERVICE STUDIES.

It is suggested that cost of service studies be made at yearly intervals by classes of business, and that the industrial rates for the company be set, if practicable to do so without doing violence to the status, so that the industrial rates will not produce an abnormally high or low rate of return. Statements showing the rate of return for various classes of business, based on the annual cost of service study and the current revenue, may be easily prepared on a monthly basis. Industrial rates should, however, not be disturbed unless and until justified by proper or much improved rate structure for the customers as a whole, or unless any decrease will be more than compensated by the increased profitable business from this class.

NEW INDUSTRIAL FIELDS.

There seems to be opportunity for largely increased sales of gas for industrial purposes in those large furnace heating processes of continuous or steady use requiring high and uniform temperature, with a prospect of (say) 50 p.ct. customer's hourly and daily load factor and better. Such uses offer to the gas business better outlook for steady loads than most electric power applications involve in the electrical field.

Industrial gas rate schedules should be designed to encourage this kind of business by providing rates that will recognize the unusually large demands and consumption.

INDUSTRIAL SURVEYS.

The location of such prospective business requires surveys of the field, and close co-operation of the ratemaker and the industrial gas engineer—the former in knowing fully the situation and devising rates as favourable to both company and prospective business as possible, and the latter in studying competitive fuel costs, as well as doing all the other engineering work required.

SPECIAL COST ESTIMATES.

In the industrial field especially is it true that too close an adherence to standardized cost of service methods cannot be observed. This primarily for the reason that cost of service allocations result only in average costs for the respective classes of business. The distribution of the fixed operating costs is different according to the class of business. A cost of service study gives only average values for unit investments and costs. Recourse must be had to empirical and synthetic estimates of costs, at least in many particulars. One method is to estimate the increment costs due to the addition of an industrial load; another is to assume the business of a certain class doubled, and to determine the increment costs; yet another is to set up a list of prospective business and estimate as closely and thoroughly as possible the costs entailed. The grading of fixed charges and running charges in the rate schedule, and the determination of cost differentials on which such gradations are based, are largely matters of judgment.

ELECTRICITY COMPARISON.

Industrial gas rates cannot be as low relative to domestic rates as is the case with electric service, for the reason among others that all gas is supplied from the same distribution system, whereas high-tension electric service may be supplied to large industrial customers at transmission voltages from the transmission system, thus being relieved of participation in the general distribution system costs and complexities. This consideration may be partly, at least, offset by such points as are brought out herein in connection with the "Elasticity of Distribution Capacity," later.

(To be concluded.)

TOWN GAS IN INDUSTRY.

Competition with Oil.

In his Presidential Address to the London Section of the Institute of Metals on Thursday, Oct. 13, Mr. A. H. Mundey discussed the subject of "Works Economics" from the point of view of the metallurgist. Dealing first with fuel, he said that in small foundries coke was almost always used; and he believed it was economical. In such foundries, where the fireman had reasonable opportunities, in between looking after his heats, to clean his furnaces and to look after the fuel supply, it was as cheap as any other fuel. Capital outlay was minimized, and therefore overhead expenses were kept down, and the operations were simply and cheaply performed. The drawbacks to the use of solid fuel were manifold. There were the carting of the solid fuel, the removal of ashes, the fact that only a certain proportion of the fuel was burned; and there were smoke, dirt, space occupied, and a number of other factors to be set against the economy of solid fuel. At the same time he knew many foundrymen who, if starting a foundry of four or five pots, and not having much capital, would put in pit fires burning coke.

A readily available alternative to solid fuel was town gas, but for ordinary purposes this seemed to be expensive. At the same time, there were cases in which it was used to advantage in spite of this. In one of his own Company's works it was necessary to decide a short time ago whether a section should be started up using town gas, coke, or oil. It was not desired to spend much money; and coke was ruled out as being an intolerable nuisance. The labour, space, and dirt involved outweighed any small advantage in the matter of cost. It was decided, therefore, to adopt gas; but when the costs came to be analyzed, it was found that the job would not pay with the high price of this fuel. The article manufactured was so closely priced that the cost of gas made it impossible to produce at a profit; and oil burners were introduced which enabled a small profit to be gained. This was a case which was worked out thoroughly; various types of apparatus being installed to ascertain what the costs were in each instance. This was not in London.

Mr. Dean Chandler, of the South Metropolitan Gas Company, who had helped him very much, had given him some figures showing that one company in London, melting 250,000 lbs. of general yellow metal—brass, copper and gunmetal, principally gunmetal—were able to effect a considerable saving by the use of town gas. In his own works, when dealing with low melting-point metals—white metals generally—it had been found that town gas paid thoroughly well. In this particular case there was no available space whatever for handling solid fuel. The cost for melting and re-melting these alloys came out at between 3s. 6d. and 4s. per ton. The South Metropolitan Gas Company had given such an enormous amount of assistance that the work was being carried out very satisfactorily from all points of view. It paid in this case to use gas because of the convenience and the cleanliness and the clever way the workmen and the overseers did their work.

He had been told by a number of men who had had considerable experience, that for general foundry work one-third of a ton of coke per ton of metal was a general requirement. For tilting furnaces, a much smaller amount of coke was used. From 60 to 100 lbs. of coke would melt 500 lbs. of gunmetal in the tilting furnace, using a 600-lb. pot; the life of the pot being about 40 heats.

On the question of comfort, convenience, facility of working, &c., the advantages of gas were immeasurable.

THE GAS INDUSTRY: PAST, PRESENT, AND FUTURE.

PUBLIC UTILITY SERVICES.

Inaugural Address of the Chairman of the London Section of the Society of Chemical Industry, Mr. W. J. A. Butterfield, M.A., F.I.C., delivered at a Meeting on Oct. 3.

[Reprinted, with additions, from the Transactions of the Society of Chemical Industry.]

(*Concluded from p. 253.*)

The Trend of Developments.

The two primary conditions of continuity of supply and uniformity of calorific value having been discussed, the trend of developments in gas-works operations, and in the distribution and use of gas, may be briefly reviewed.

Recent years have witnessed the gradual introduction of great changes in gas manufacturing processes, of which perhaps the most fundamental is the carbonization of coal in retorts or chambers into one end of which it is delivered continuously, or in small instalments, while the coke is similarly withdrawn from the other end. The intermittent charging and complete emptying of retorts has almost disappeared from many of the larger works, and therewith has gone the one gas-works operation which was apt to be productive of smoke. The modern gas-works, in the matter of smoke and dust, compares extremely favourably with any industrial works of similar magnitude. In particular it contributes much less to the smoke pall over our big cities than do the large electricity power stations. Anyone in London who is in doubt on this point should ascend the tower at the North End of the Crystal Palace on a fairly clear day, and observe the heavy trail of smoke and fine ash, extending for half-a-mile to a mile, from the four chimneys at the Lots Road electricity station, and similar trails from generating stations at Greenwich and other parts of the Metropolis. The air over the big gas-works, where even more coal is handled, is seen from the same commanding height to be free from any such heavy smoke pall. It is a matter for serious consideration from the standpoint of public hygiene whether generating stations, if still allowed on the outskirts of, or within, our big cities, should not be compelled by law to use only coke or other smokeless fuel, and to adopt adequate means of arresting blown ash-dust.

The directions in which from the chemical standpoint improvements in gas technique have been effected are in the reduction of the proportion of incombustible gases in the gas supplied, and the removal from it, more or less completely, of other obnoxious constituents, such as naphthalene, cyanogen compounds, and carbon disulphate. For the reduction in the proportion of incombustible constituents, the system of charging for gas supplied by the therm instead of by simple volume is largely responsible.

Coke Oven Gas.

In certain parts of the country, large quantities of gas—about 2322 million c.ft. in 1926—are being taken by gas undertakings from coke oven works, where the gas had been hitherto a more or less wasted bye-product. The utilization of coke oven gas in this manner is increasing, and would increase at a far more rapid rate were it not for the uncertainty as to the continuity of such supplies of gas at times of labour difficulties at the collieries to which the ovens are attached. The management of coke oven plant does not differ appreciably from that of carbonizing plant at gas-works; and it would appear highly desirable that in every case in which the gas supply of a district is drawn mainly from coke ovens, the ovens should be operated by the gas undertakers instead of by the colliery owners. Such a course would remove the doubts of some of the miners as to whether the coke ovens do not bring undisclosed profits to the colliery proprietors, since the purchase of the coal by the gas undertakers for use in the coke ovens would appear in the ordinary way in the colliery accounts, and the sale of the coke and bye-products would be in the hands of the gas undertakers. The difference between a coke oven works operated by gas undertakers and a gas-works similarly operated would merely be that in one case the undertakers might have difficulty in disposing economically of surplus gas, whereas in the other case they have at times a superfluity of coke. Gas and coke would change places as the bye-product, but undoubtedly the gas undertakers are in the best position to handle a surplus of either in the general interests of the community. The miners would not have the same objections, in times of labour differences at the mines, to facilitating the supply of coal to coke ovens owned by or leased to gas undertakers as they have had to allowing coke ovens owned by the colliery proprietors to continue at work. In this direction, the responsibility of gas undertakings for the carbonization of coal, whether primarily for gas or for coke production, should be extended.

Concomitantly, in other areas, if the electricity generating stations are required to consume smokeless fuel, they should undoubtedly be put in the hands of the gas undertakers, who would either become responsible for the distribution and retailing of current as well as gas, or would supply the current in bulk to existing electricity distributing organizations. Great economy in the handling of fuel would ensue in many districts if the electricity generating station were an adjunct of the gas-works.

The Uses of Gas.

It is not generally realized how largely gas is now consumed for industrial purposes. To go back only to 1912, the peak load of a gas undertaking in winter time would commonly be found at about six o'clock in the evening. On Sunday in the summer months, the peak load in England was between 11 and 1 o'clock, when dinner was being cooked in thousands of small houses. This peak about mid-day on Sunday did not, and does not, occur in Scotland, where hot solid nutriment on that day is taboo. Curves showing the load at different hours of the day at the present time have been furnished to me by a gas undertaking which serves an important industrial and labouring class district in England (fig. 5). The week-day curves refer to Tuesdays, and both week-day and Sunday curves are for days in December (not Christmas week) last and July last. The heaviness of the daylight load on week-days and its uniformity in summer and winter is a principal feature, though the Sunday cooking load still accounts for the highest peak in the curves. It is evident, however, that a regular and very large consumption of gas in factories and works can alone account for the week-day daylight outputs.

Another illustration of the magnitude of the industrial use of gas may be given. There are two contiguous works in Sheffield, belonging to one firm, which consumed in the year 1926 over 88 million c.ft. of gas, having an average calorific value in excess of 500 B.Th.U. per cubic foot. Other works in the same town belonging to the same firm also consumed large quantities of gas, but the figure given refers to the supply to what is practically a single premises. The maximum size of service pipe to any consumer's premises in Sheffield is 14-in. There may be other towns in which industrial works have even larger service pipes and take, individually, larger quantities of gas.

Gas in Industry.

The use of gas for industrial heating dates from before the year 1815, as R. Ackermann, in a letter dated March 13, 1815, stated "my printers employ 16 cockspur burners for ten hours per day to heat their plates instead of charcoal fire." He gives the cost of the charcoal thus dispensed with at £25 per annum. F. Accum, in his book on "Gas-Light," published in 1815, reports that Mr. Cook, a manufacturer of metal toys at Birmingham, saved £30 per annum "in candles, oil, and cotton, for soldering, which since the adoption of gas in his premises has been performed solely by its flame." A firm in Southwark was also reported to be using gas for soldering at that date. At the present time, however, varieties of industrial applications of gas are far too numerous to recite—someone has enumerated 3000. But, briefly, it may be said that these include its extensive use by heavy engineering firms, electrical manufacturers, motor-car works, varnish makers and lacquerers, sugar boilers, manufacturing confectioners, bread and biscuit bakers, tool, rivet and chain makers, printers, solder manufacturers, tube makers, and foundrymen.

A development of special interest to chemists in the use of gas for industrial heating purposes lies in the process of submerged combustion, as conducted by Featherstone-Hammond and others. As many of you know, the flame of a mixture of gas and air in proper proportions, and under pressure, is submerged in the liquid which it is desired to evaporate or perhaps merely to keep in molten condition. The economy of such internal heating is obvious; but there are many concomitant advantages in its application to solutions of salts which are liable to dissociate, and to liquids which attack the materials of externally-heated vessels.

Gas for Public Lighting.

There appears to be a tacit assumption in some quarters that gas should give place to electricity for public lighting. It would, however, seem that electricity in reality has no proper sphere in outside lighting whenever gas and modern gas lighting appliances are available.

In this connection, it is interesting to refer to the recently issued British Standard Specification for Street Lighting. In most respects an admirable document, for which the members of the Sub-Committee who laboured freely and long on its preparation deserve the highest praise, it appears to have one serious defect, in that the high-intensity electric filaments and gasfilled electric lamps may be exposed in clear glass globes in our streets. The method of estimating "glare" given in

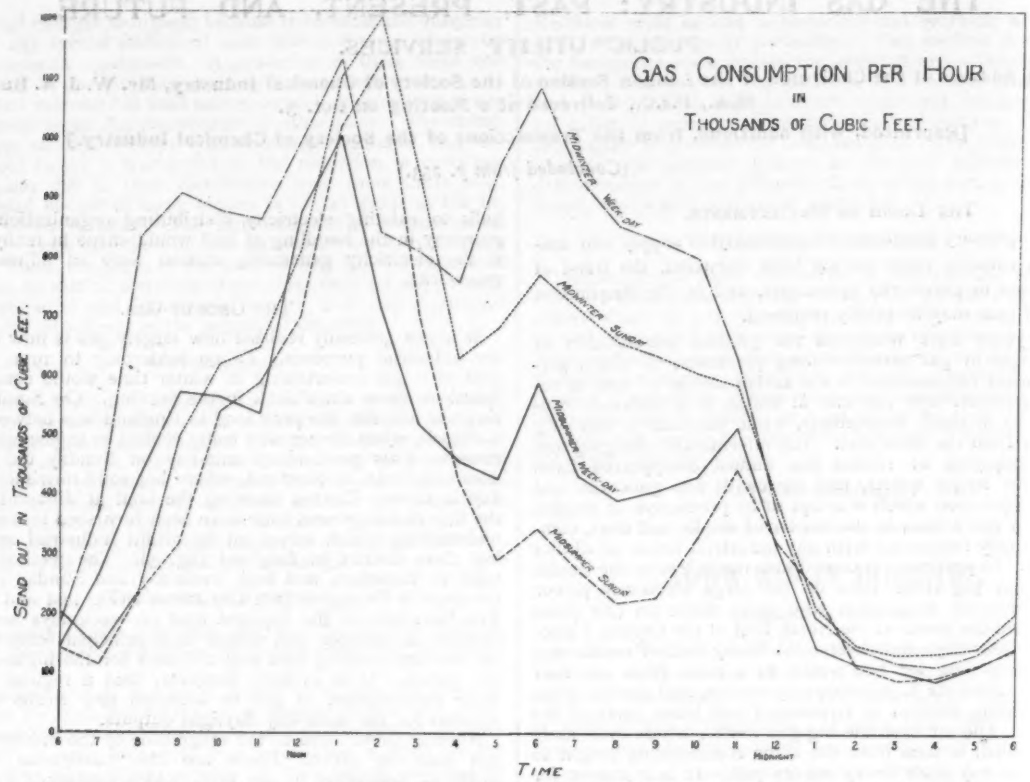


FIG. 5.—CURVES OF HOURLY CONSUMPTIONS, WEEKDAY AND SUNDAY, MIDSUMMER AND MIDWINTER.

the specification does not appear to take any account of the distracting effect on drivers of a light source of very high local intensity, and the discomfort it causes to passengers and persons on foot. The attention of the eye is arrested by the brilliant speck of light; the eye is half-blinded, or at least incommoded, thereby, and distracted from the ground and the objects thereon which the light is intended to bring into view. The ideal of good outdoor illumination is that the source of light should attract the attention of the eye as little as possible; and clear-glass electric lamps are the antithesis of this ideal. Their distracting and annoying ill-effects are in certain places—as in the borough of Croydon—multiplied by the fitting of plane mirrors in the street lamps, which have the effect of reflecting the obnoxious filament in nearly horizontal beams in the line of the foot and carriage way. The lamps themselves become the centre of attention, and the objects on the roadway miss the eye. The incandescent gas mantle gives, next, perhaps, to the acetylene flame, the most perfectly self-diffusing source of light; and consequently gas lighting becomes the safest and most satisfactory method of outdoor illumination—especially as it is not subject to the sudden failures over wide areas which occur with electricity.

Comparatively little would have been done in electric street lighting, if it had not been for the fact that seven-elevenths of the electricity supplied in Great Britain is from works belonging to the local authorities, who are also generally the authorities responsible for the public lighting. In several instances the electrical engineer has been appointed the public lighting engineer. One can picture him investigating impartially the relative merits of gas and electricity for street lighting, and the glee with which he would give his verdict in favour of gas. There can be no question that the authority and the engineer responsible for the settlement of questions of public lighting should be in no way connected as owners or servant with either the gas or the electricity undertaking, which are in competition for the lighting of the streets.

The plea that the public lighting load is very useful to the electricity undertaking, and enables it to sell current more cheaply to consumers than it otherwise could, is entirely one-sided. The public lighting load is useful to a gas undertaking also, and enables it to supply gas more cheaply to *its* consumers, whose pockets, generally speaking, are at least as deserving of consideration as the better-lined ones of electricity users.

Given a fair field and no favour, there is no doubt that gas would secure a practical monopoly in street lighting, to the great relief of users of the highway. This observation applies with special force to public lamps, in which the height of the luminous centre of the light source is not more than 18 ft. from the ground, or which are on the outskirts of the zone of public lighting. It also applies very forcibly to detached country towns and villages, as clear-glass or high-power electric lamps in the street there become a very dangerous distraction to drivers approaching from the unlighted country roads.

GAS SUPPLY IN COUNTRY DISTRICTS.

The innate superiority of gas over electricity for street lighting can only be redressed by the application of screening and diffusing devices to the electric lamps, with consequent waste of their illuminating power. This fact suggests that rural areas should be given a gas supply before the question of carrying electricity to them by overhead transmission lines is entertained. The poles and lines are eyesores on the countryside, and as air-travel becomes more general will constitute a very grave danger, as the death a few months ago of a balloonist who fouled overhead cables in the northern outskirts of London clearly proves. The transmission of electricity to rural districts by overhead lines should not be tolerated unless it is shown (1) that there is a substantial demand for it, which gas supply would not meet, and (2) that it cannot be generated as cheaply from coal gas, oil, or other fuel on the spot as it can be supplied through overhead lines from a central generating station.

Electricity can be generated cheaply and conveniently from coal gas, whereas gas cannot be produced from electricity—except in the advertisement pages of "Punch," or inadvertently from the cable insulation, as in a fatal accident recently at Acton. Improvements in small gas and steam engines are imminent, which will lower the cost of generating current from gas. Hence if a gas supply is given to any rural district, electricity is thereby rendered available to country houses, farmers, or others who desire it, either from independent generating sets, or from a local station operated by the gas undertaking. Overhead electrical transmission, on the other hand, will not assist the countryside to obtain a supply of gas, for which, experience proves, there is a greater general demand than for electricity. Figures given later will support this statement. It would appear that government grants, and guarantees under the Trades Facilities Act, could be more usefully applied towards the extension of gas supply to rural districts than to furthering grandiose schemes of electrical development.

Gas supply to rural districts is already progressing fairly rapidly through private enterprise, and it would advance much faster were it not for the threat of subsidized electricity as a competitor. There are at least three gas undertakings in the South of England alone which send gas under relatively high pressure through small mains to rural districts twenty miles distant from the gas-works, and considerable developments in this direction may be expected in the near future, especially if such schemes are put on equal terms, as regards financial facilities and wayleaves, with electricity supply schemes. Airmen at least will prefer the underground gas main to the overhead transmission line.

THE GROWTH OF GAS SUPPLY.

A diagram is shown (fig. 6) of the sales of gas and the number of premises supplied with it in Great Britain for the years 1882 to 1926. It has been prepared from the published returns which have been made to the Board of Trade year by year from

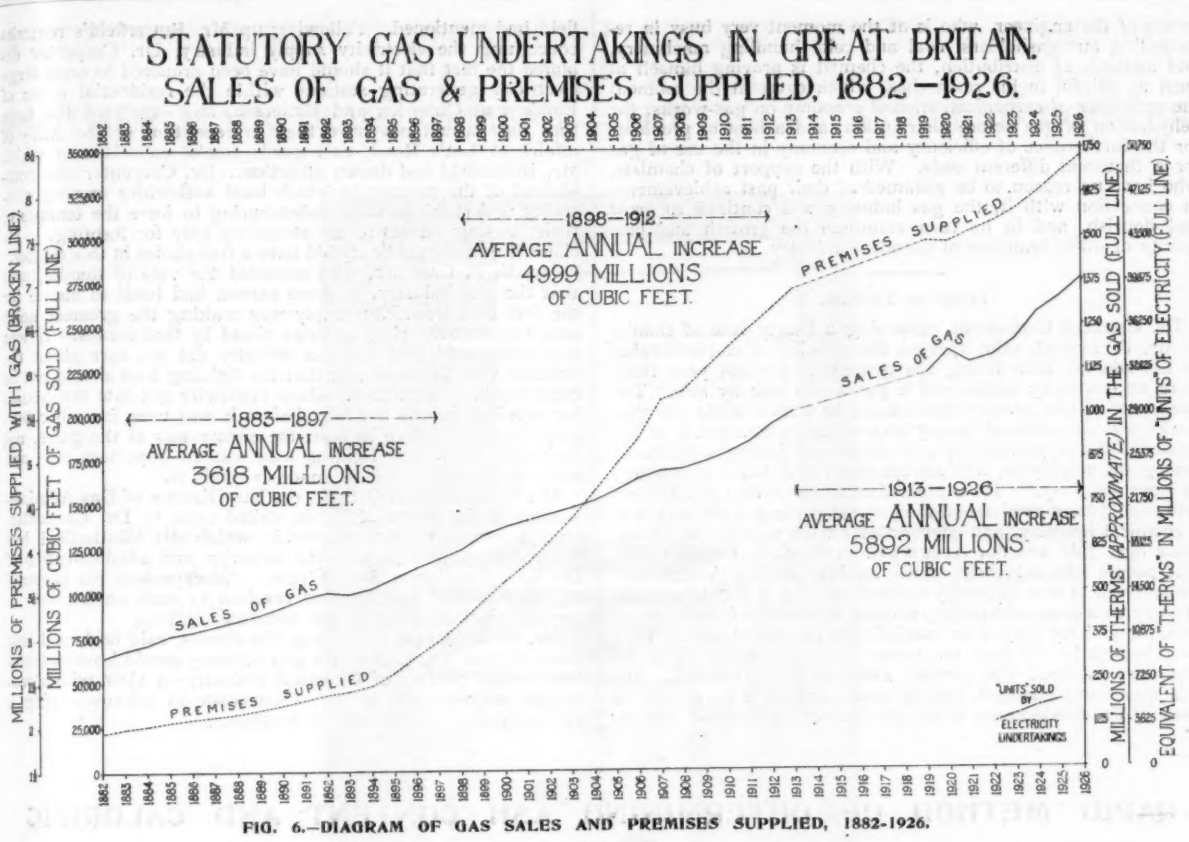

STATUTORY GAS UNDERTAKINGS IN GREAT BRITAIN.
SALES OF GAS & PREMISES SUPPLIED, 1882–1926.
1883–1897
AVERAGE ANNUAL INCREASE
3618 MILLIONS
OF CUBIC FEET.
1898–1912
AVERAGE ANNUAL INCREASE
4999 MILLIONS
OF CUBIC FEET.
1913–1926
AVERAGE ANNUAL INCREASE
5892 MILLIONS
OF CUBIC FEET.
SALES OF GAS
PREMISES SUPPLIED
"UNITS" SOLD BY ELECTRICITY UNDERTAKINGS
MILLIONS OF PREMISES SUPPLIED WITH GAS (BROKEN LINE).
MILLIONS OF CUBIC FEET OF GAS SOLD (FULL LINE).
MILLIONS OF "THERMS" (APPROXIMATE) IN THE GAS SOLD (FULL LINE).
EQUIVALENT OF "THERMS" IN MILLIONS OF "UNITS" OF ELECTRICITY (FULL LINE).

FIG. 6.—DIAGRAM OF GAS SALES AND PREMISES SUPPLIED, 1882-1926.

1882 to 1926 (omitting the war years 1913-18) by all authorized gas undertakers in Great Britain. The figures for Ireland have been omitted throughout, so that those given in the diagram are strictly comparable over the whole period. It will be seen that development in the use of gas has continued at a progressively increasing rate from 1882 to the present time. This may perhaps best be realized by disregarding the small annual fluctuations, and grouping the whole 45 years covered by the diagram into three approximately equal periods. In the fifteen years 1883-97, the sales of gas increased *each year*, on the average, by 3618 million c.ft. In the next fifteen years, 1898-1912, the average annual increase had risen to as nearly as possible 5000 million c.ft.; while in the last fourteen years, 1913-26, the average increase per annum is no less than 5892 millions. The war years appear to have slowed-down the rate of increase, but the last two or three years have greatly quickened it. The scales on the right-hand side of the diagram show the approximate equivalents in therms of the cubic feet of gas sold, and to how many units of electricity these therms correspond in potential heat development.

As regards the number of premises supplied with gas in Great Britain (shown by the broken line in the diagram), the advance is from 1,931,551 in 1882 to 8,404,561 at the close of 1926. The rate of advance in the number of premises supplied was especially rapid from about 1895 to 1907, which period covered the general introduction of the prepayment meter. The average consumption at each premises naturally fell considerably when a new class of consumers was thus introduced. It is, however, deserving of note that the average consumption per premises supplied, which in 1882 was about 33,560 c.ft. per annum, and fell in 1911 to about 28,500 c.ft., had last year reached over 32,900 c.ft., or very little short of the figure for 1882. This close agreement between the average returns from each consumer's meter at the beginning and end of a period of 45 years (in which period the number of premises supplied has multiplied more than four-fold) is a remarkable testimony to the stability of the gas industry. The falling-off in the consumption per premises which took place in the middle of the period has been almost wholly recovered, whether owing to increased use of gas for industrial purposes, or domestic heating, or to increased spending power of a large proportion of the prepayment meter consumers, is a question which does not admit of a simple answer.

Comparative Figures for Electricity.

In the right-hand lower corner of the diagram are shown the units sold by authorized electricity undertakings in Great Britain in the years 1922-25. These sales do not include current generated by railway companies, tramway authorities, and non-statutory undertakings, which together would add a little over 20 p.ct. to the "sales" figures shown in the diagram. It is obvious, however, that whether the tramway and railway consumption of current is included or omitted, the total number of units of electricity sold in Great Britain is not, on the heat unit basis, yet equal to the sales of gas 45 years ago. Nothing said in this connection refers to electricity generated by users from gas, oil, or steam engines on their own premises. Public supplies of electricity only are being considered.

The most striking aspect of the sales of electricity in recent years is brought out more clearly in Table IV., which shows the equivalents in therms of the gas and electricity sold in 1922-25. The relative annual increases in sales demonstrate that electricity cannot keep pace with gas in the race for public patronage. For every additional unit of electricity which people have bought in the last three years, they have increased their purchases of gas by the heat equivalent of over 2½ times that of the electricity. It is not a case of electricity supply gradually improving its position relatively to gas supply—when the two are put on the comparable basis as distributors of potential heat, electricity is seen to be falling more and more behind gas in the esteem of the community.

Conclusion.

The object of this address has been to portray the development and stability of the one great public utility service which is itself fundamentally a chemical industry, and is the fountain head from which other important chemical industries originate. While the future of gas supply will be advanced by the achieve-

TABLE IV.—*"Therms" Sold in Great Britain by Authorized Gas and Electricity Undertakings.*

Year.	Gas.			Electricity.			Ratio of Gas Increase to Electricity Increase.
	Thousands of C.Ft.	Equivalent in Therms.	Increase on Previous Year. Therms.	Units.	Equivalent in Therms.	Increase on Previous Year. Therms.	
1922	232,602,789	1,163,013,945	..	3,645,190,732	125,394,561	..	..
1923	241,626,603	1,208,133,015	45,119,070	4,338,850,926	149,256,471	23,861,911	1·89 : 1
1924	256,891,922	1,284,459,610	76,326,595	4,997,963,253	171,929,935	22,673,464	3·37 : 1
1925	265,757,353	1,328,786,765	44,327,155	5,515,345,364	189,727,880	17,797,945	2·49 : 1
1926	276,568,647	1,382,843,235	54,056,470	..	..	..	..

ments of the engineer, who is at the moment very busy in remodelling our gasholders, coal and coke handling machinery, and methods of distribution, the chemist is proving himself at least as helpful in his researches, which cover at the moment the principles of carbonization, fuel economy on gas-works, the dehydration of gas before distribution, and a host of problems for the furtherance of efficiency and economy in the use of gas for a thousand different ends. With the support of chemists, who have no reason to be ashamed of their past achievements in connection with it, the gas industry will continue to grow and flourish, and in its turn stimulate the growth and prosperity of other branches of chemical industry.

VOTES OF THANKS.

Dr. CHARLES CARPENTER, proposing a hearty vote of thanks to Mr. Butterfield, said, *apropos* the mention of co-partnership in the address, that during the general strike last year there were an electricity works and a gas-works side by side. The employees of the former marched out on strike, while the gas-works was not affected in any way—due, he contended, to the existence of a co-partnership scheme and the feeling engendered among the employees, who always referred to the gas company as "our company." He expressed satisfaction that Mr. Butterfield should have emphasized the point that the gas industry was a chemical industry, and commented on the manner in which, years ago, this was not recognized. Indeed, in the past, certain people had set their minds against such a recognition, though now it was generally understood that it was impossible to carry on a gas undertaking without a scientific foundation in which chemistry played an exceedingly important part. To a large extent in the past the industry had been carried on by engineers without the partial assistance of chemists. But this was being changed entirely now; and to it he attributed some of the development in the gas industry which Mr. Butterfield had mentioned. Following up Mr. Butterfield's remarks concerning the electricity supply industry, Dr. Carpenter deplored the fact that it should have been proposed to erect large electricity generating stations within the residential areas of London, at Chiswick and Battersea, and expressed the hope that they would not have there a repetition of the state of affairs at Lot's Road, as regards smoke emission, to which Mr. Butterfield had drawn attention. Dr. Carpenter also complained of the manner in which local authorities owning electricity undertakings were endeavouring to force the tenants of their housing estates to use electricity only for lighting. He claimed that the public should have a free choice in this matter.

Mr. C. S. GARLAND, who seconded the vote of thanks, said that the gas industry, to some extent, had itself to blame for the fact that electricity supply was making the greatest noise and was endeavouring to forge ahead by that means. It was sometimes said that the gas industry did not care about the lighting; but his view was that the lighting load should not be regarded in this manner. Once electricity got into the houses for lighting, it was not long before it was used for other purposes; and the place to fight the enemy was at the gates, not inside the city. The lighting load was an important one, and every endeavour should be made to retain it.

Mr. H. C. HONEY, O.B.E., the late Director of Gas Administration at the Board of Trade, called upon by Dr. Carpenter, paid a tribute to the manner in which Mr. Butterfield had worked in connection with the inception and administration of the Gas Regulation Act of 1920. He expressed his personal satisfaction that the Act had resulted in such an increase in the technical efficiency of the industry.

Mr. BUTTERFIELD, expressing his thanks, said he hoped that more of those engaged in the gas industry would become members of the Society of Chemical Industry—a view which was echoed subsequently by Dr. CARPENTER in acknowledging a vote of thanks to himself for presiding.

RAPID METHOD OF DETERMINING ASH CONTENT AND CALORIFIC VALUE OF COAL.

Approximate Evaluations.

In "Fuel in Science and Practice" for October, P. N. Lategan describes an interesting volumetric method for determination of the ash content and the calorific value of coal. His method has three outstanding advantages—no expensive apparatus is necessary, very little skill in manipulation is required, and both ash content and calorific value can be obtained in less than three minutes. True, the values are approximate; but the error, he states, is within 2 p.ct. And there must be many instances when rapid determination of the ash content and calorific value of coals is valuable.

The real specific gravity of clean coal varies between 1·25 and 1·35. For all practical purposes, the impurities are twice as heavy as clean coal. It follows that the amount of impurities present—or, in other words, the ash content of a coal sample—must be a linear function of its density. Naturally, this relationship will vary slightly for different seams deposited in different areas under different conditions. A definite relationship does exist, however, for each seam or for seams in the same area where they contain the same type of impurities. In a finely-divided state, the volume occupied by a given quantity of coal and its impurities is inversely proportional to its density. If specific volumes of coals of varying ash content are plotted against ash percentages, the points fall on a straight line.

The problem is, therefore, to measure the specific volume of the coal; and this is effected by a Taffanel voluménomètre, which is a simple specific gravity flask with a graduated stem. It is so arranged that when a definite quantity of dust and 50 c.c. of alcohol are added, the volumes occupied by the dust can be measured by reading the meniscus of the alcohol on the graduated stem. By reference to a calibration table or graph, the corresponding ash content may be found.

Details of the method are given by Mr. Lategan; and he mentions that 200 samples of Nos. 1 and 2 seams of the Witbank (Johannesburg) district were tested. The greatest difference between the ash percentages read from the calibration curve and those determined by incineration was less than 1 p.ct. As a matter of fact the ash content of the 200 samples examined ranged from 8 to 25 p.ct. An error of less than 1 p.ct. over this range of ash content is most satisfactory when it is considered that errors of the same magnitude are possible by incineration of coals containing a high percentage of shale, carbonates, and pyrites unless the "ash as weighed" is corrected.

RELATIONSHIP BETWEEN ASH CONTENT AND CALORIFIC VALUE.

For convenience, we may divide coal into combustible and incombustible material. The calorific value of a coal naturally depends on the quantity and nature of the former. As a rule, states the author, coals from the same seam or series of seams from the same area have "combustibles" of similar chemical composition. Therefore, the heating value of the "combustibles" should be constant, and equivalent to the calorific value of the wet coal divided by 1 *minus* the sum of the ash and moisture. In practice, however, this is not the case, since the percentage ash (as weighed) increases as the calorific value of the coal decreases.

Assuming that coals deposited under similar conditions in a particular area contain incombustible matter of similar composition, the percentage loss on incineration will be the same, and the calorific value, therefore, a linear function of the ash percentage (as weighed). Since the calorific value of dry coal is equivalent to the calorific value of the pure coal substance multiplied by 1 *minus* the ash as weighed, it follows that the dry coal must be a linear function of the ash percentage (as weighed).

When the calorific values and ash percentages of 150 samples of coal from Nos. 1 and 2 seams of the Witbank district were determined, and the calorific values in B.Th.U. per lb. (dry basis) plotted against their ash percentages (uncorrected, or "as weighed") a straight line was obtained. The graph showed that when the ash percentage is zero, the calorific value of the pure coal substance is 15,600 B.Th.U. per lb., and when the ash percentage is 84, the calorific value becomes zero. The author goes on to state that the relationship between the calorific value and percentage ash may be expressed by the formula:

$$E = \frac{15{,}600}{84}(84 - A)$$

$$= 186\,(84 - A)$$

where E = calorific value in B.Th.U. per lb. (dry basis)

A = ash p.ct. (as weighed).

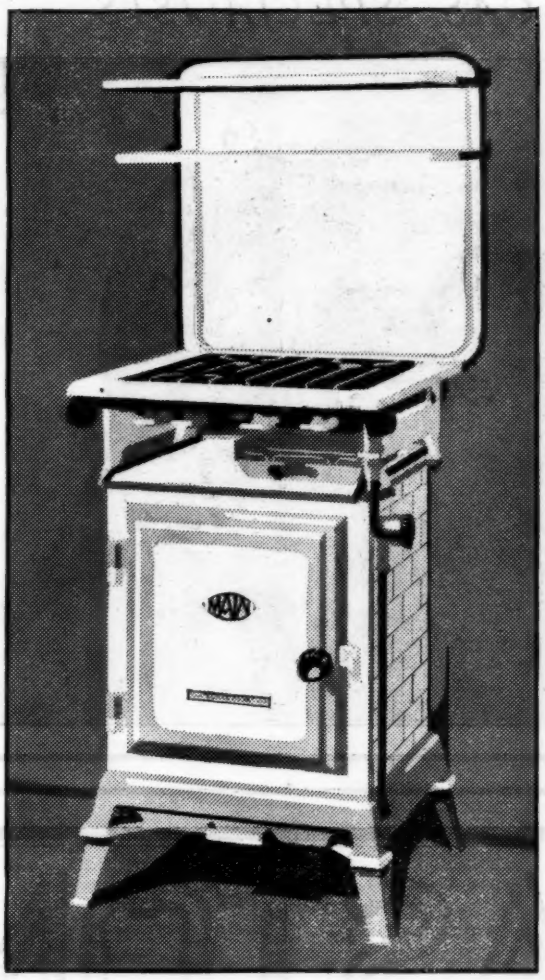
This formula indicates that the average loss on incineration is 16 p.ct. (or, assuming that the chemical composition of the pure coal substance gradually changes with increasing ash content, equivalent to an apparent loss of 16 p.ct.); while each per cent. increase in the ash content of the coal represents 186 B.Th.U. per lb. decrease in the calorific value.

The results expressed by this formula for Witbank district coals (containing less than 2 p.ct. of moisture on the air-dried basis) represent an accuracy of within ½ p.ct.

By determining the ash percentage by the voluménomètre, and reading the calorific value from the straight-line graph, the maximum error possible, says Mr. Lategan, is within 2 p.ct. This maximum may, he suggests, be reduced to 1 p.ct., if separate graphs are prepared for each individual colliery.

ANOTHER MAIN DEVELOPMENT—THE ALL-ENAMELLED COOKER

Write now for full particulars



Order a Cooker for your Showroom

An Appliance of Shining Beauty

The illustration portrays the new Deluxe "MAINAMEL" Finish now obtainable on the High-Grade "Maintenance" Gas Cookers, fitted with "Conservor" Ovens and "Mainstat" Automatic Cooking Control. There are two styles of this tenacious, non-chip, All-Enamelled Finish: DELUXE and MOTTLED.

R. & A. MAIN, Ltd., LONDON AND FALKIRK

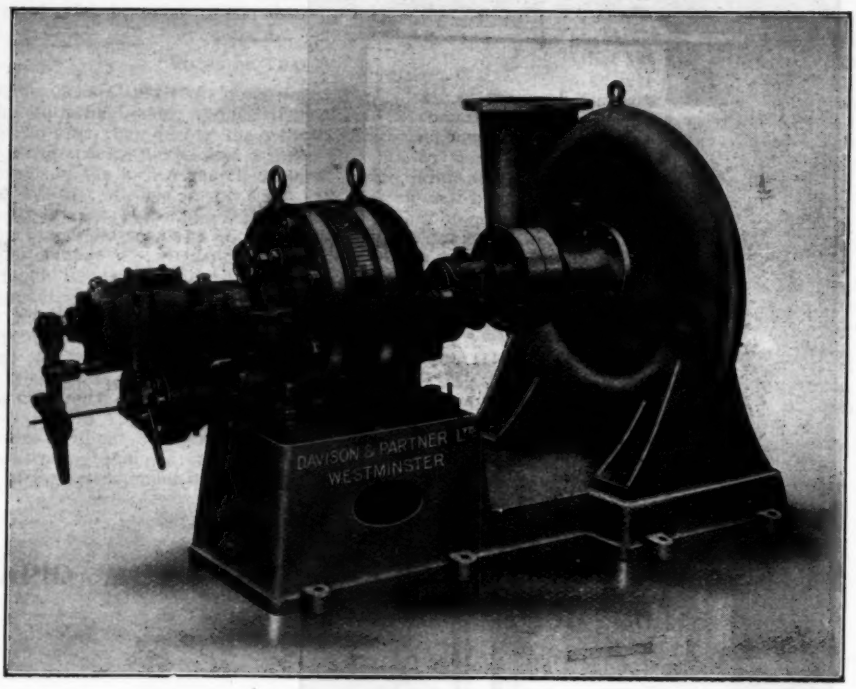
London Office and Showrooms, 48, Grosvenor Gardens, S.W. 1.
Glasgow Office and Showrooms, 82, Gordon Street.

MAIN

DAVISON & PARTNER, Ltd.

11, Carteret St., Westminster, S.W. 1,

WATER-GAS SPECIALISTS.



Turbo-Blowers

Electric Blowers

Galvanised Blast Mains

Blast Main Dampers

Efficient High Pressure Blowing Sets mean:—

SHORTER BLOWING PERIODS.

INCREASED MAKE PER MINUTE.

INCREASED GAS-MAKING TIME PER SHIFT.

Write for further information.

URASTONE.

NON-CORROSIBLE

Flue Pipes and Fittings

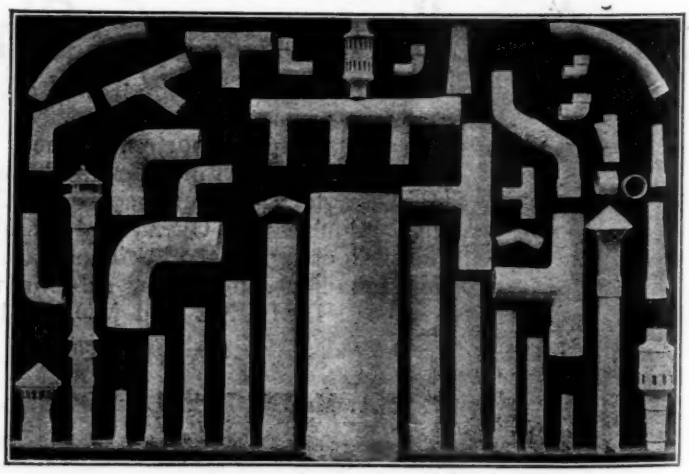
which

Save cost of maintenance

Eliminate drip and condensation troubles

Are fixed easily

Are worthy in service and appearance of the gas appliance to which they are fitted.



SPECIAL QUOTATIONS FOR LARGE QUANTITIES.

CELLACTITE WORKS LTD.

LONDON SALES OFFICE: Lincoln House, 296, High Holborn, W.C.1. Telephone: Holborn 1760.

WORKS: HIGHAM, KENT.

SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).

VISIT TO THE FALKIRK GAS-WORKS.

On the invitation of the Town Council, the Association visited the Falkirk Gas-Works on Saturday, Oct. 22, and were received by Mr. H. G. Ritchie (the Manager) and members of the Gas Committee, on behalf of the Corporation. They then inspected the works, under the guidance of members of the staff, and were afterwards entertained at tea in the Temperance Café, Falkirk. Here they were welcomed by the Convener of the Gas Committee, Captain H. J. Kennard, to whom Mr. R. Fife (the President) replied. A programme of songs was enjoyed; and during intervals short addresses were given by Ex-Provost Muirhead, Bailie Logan (Convener of the Electricity Committee), and Mr. J. Hall (Past-President of the Association).

From particulars supplied by Mr. H. G. Ritchie, A.M.I. Mech.E., the Engineer and Manager, we give the following description of the plant.

The carbonizing plant consists entirely of Glover-West vertical retorts, which came into operation in October, 1921. The installation consists of five beds of eight retorts, with the usual coal handling and conveyor plant. Owing to the nature of the subsoil and the proximity of the Forth and Clyde Canal, the coal breaker is overhead. When large coal is being used, it is tipped into the conveyor pit, caught in the buckets, and raised to the breaker; the broken coal passing into the conveyor buckets which travel underneath. When nuts are being employed, the coal breaker is by-passed. The motive power for conveyors and coal breaker is taken from the Corporation Electricity Department. The retort installation rests on 79 reinforced concrete piles, the average depth of which is 47 ft. 6 in. The motive power for the extraction gear is town gas, used in "National" engines, which are in duplicate. A steam hoist is employed as a stand-by in case of a breakdown of the conveyor, which deals with coke as well as coal. A full description of the retort bench appeared in the "JOURNAL" for Feb. 15, 1922, p. 370.

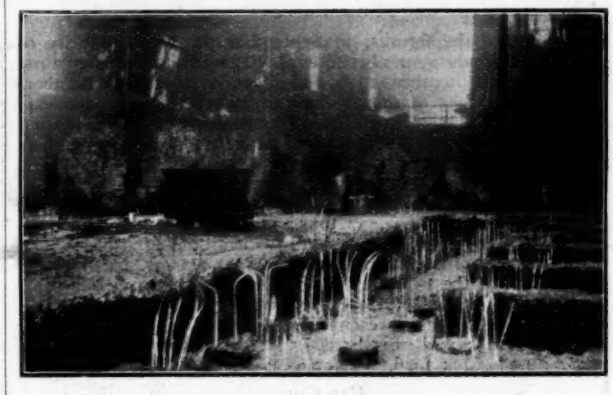
The exhausters originally fitted in the works were two of the Laidlaw type. These have been altered to Waller four-blade units capable of passing 80,000 c.ft. per hour.

The condensing plant consists of two rows of 10-in. pipe running alongside the canal bank. These condensers were put down as temporary plant several years ago, after an explosion occurred in the water-tube condensers. This method has been so satisfactory that these condensers still remain in use.

The purifying plant consists of a Livesey washer, a Holmes vertical brush scrubber through which weak liquor from the wells is pumped, and a Holmes horizontal brush scrubber. There are four 30-ft. square purifiers worked by a Weck centre valve. The flow of gas is downwards.

The station meter is in the same building as the exhausters. All connections in the works are 18 in. There are two holders, one of a capacity of a million c.ft., and the other 750,000 c.ft. The station governor is a Foulis; the air bell being fitted in the meter house 500 ft. away.

The only coal storage at present is in the open alongside the railway siding. Work is now being carried out converting what was the horizontal retort house into a coal store; an extension of the railway siding being made at present.

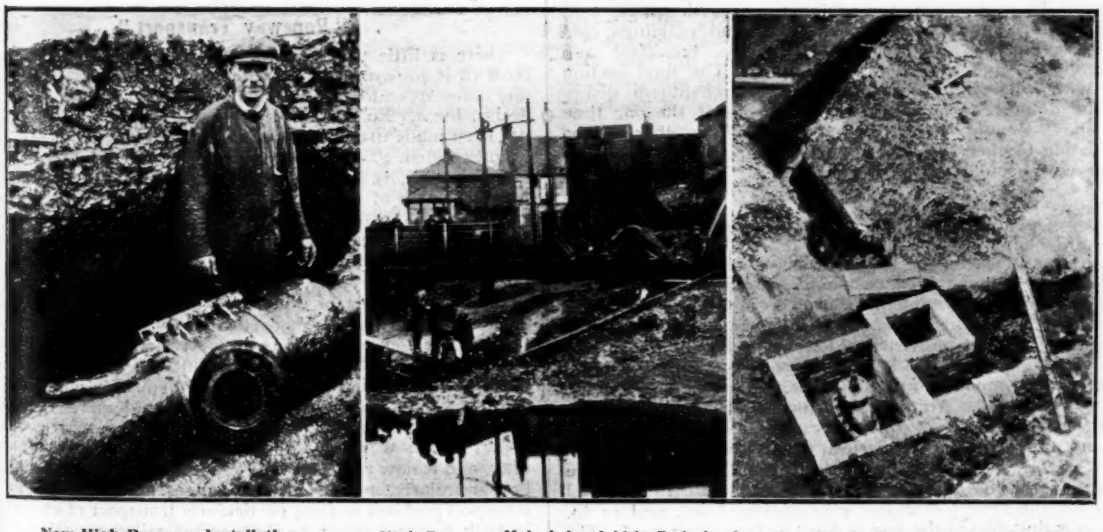


Top of Reinforced Piles, Retort Bench Foundations.

A Bryan-Donkin horizontal steam-driven duplex reciprocating compressor, capable of passing 80,000 c.ft. per hour at 175 R.P.M. against 10 lbs. per sq. in. pressure, has just been installed in the works. This apparatus was rendered necessary to boost the pressure in the Larbert and Camelon districts. Gas is fed into the existing low-pressure main through a 6-in. Reynolds governor two miles from the works, to supply Carron, Carronshore, and Larbert, and through another 4-in. Reynolds governor for supplying the Camelon district. Welded steel tubes were used for the pipe track which crosses the Forth and Clyde Canal. At that point the main is duplicated; a Y piece being fitted on either side of the canal. The exhauster, meters, and compressors are all housed in the one building, and there is ample room for extensions.

The make of gas last year was 334 million c.ft. The sulphate plant is a Holmes 2-ton per day unit, and is provided with a centrifugal drier.

The photographs illustrating this description were taken by Mr. William Ewing, Assistant Engineer and Manager.



New High-Pressure Installation.

6-in. branch inserted by under-pressure apparatus in 14-in. low-pressure main, to connect to outlet of Reynolds governor. The branch is inserted at an angle of 45°.

High-Pressure Main being laid in Bed of Forth and Clyde Canal.

Insertion of 24-in. Valve, to isolate the 750,000 c.ft. from the 1 million c.ft. holder, to prevent oscillation on station governor by compressor.

A 10-in. valve is in the smaller pit alongside, being inlet of compressor.

Institute of Fuel.—Communications for the Institute of Fuel should be addressed to Mr. P. C. Pope, the Secretary, at 53, Victoria Street, S.W. 1.

West Riding of Yorkshire Salesmen's Circle.—The meeting of this Circle which was to have been held in Halifax on Nov. 9 has been postponed till Nov. 16.

COAL AND BYE-PRODUCTS EXPORTS.

The last issue of the Board of Trade Returns contains the statistics regarding exports and imports for the first three quarters of the year. Considering the great dislocation of the coal export trade which marked the opening of the year, the coal industry has good cause for congratulation on the marked recovery that has been made, although, of course, the export business falls far short of what it was before the war. This is a point which is frequently ignored by the trade unions when clamour is made for a greater absorption of unemployed miners than the magnitude of demand warrants.

COAL EXPORTS.

Turning to the figures, in September the total quantity of coal of all kinds sent abroad was 4,242,346 tons, as against 5225 tons in September, 1926, and 3,902,006 tons in September, 1925. The values of these amounts were: 1927, £3,580,284; 1926, £4120; 1925, £3,659,844. Gas coal in September figured for 536,589 tons, compared with 514,386 tons in September, 1925; the respective values being £424,853 and £438,676. The average price per ton of gas coal in September was 15s. 10d.

Taking the nine months of the year, the total amount of coal sent abroad was 38,994,937 tons; in the same period of 1926 it was 18,978,879 tons, or, roughly, 20 million tons less. The figure for the corresponding period of 1925 was 37,464,815 tons. The values in the nine months of the three years were: 1927, £35,518,111; 1926, £17,244,456; 1925, £38,197,224. Of these quantities, gas coal represented in 1927, 4,984,857 tons; 1926, 2,491,787 tons; and 1925, 5,008,536 tons. The values were: 1927, £4,189,620; 1926, £2,032,988; 1925, £4,804,847.

GAS COKE.

The business done in gas coke abroad in September was a considerable improvement upon that of 1925. The amount shipped was 121,775 tons, which compares with 13 tons in September, 1926, and 68,115 tons in September, 1925. The values were: September, 1927, £118,753; 1926, £33; 1925, £66,229. The average value per ton was 19s. 6d.

In the nine months 636,255 tons of gas coke were exported, as against 383,408 tons in the same period of 1926, and 436,142 tons in that of 1925. The values were: 1927, £672,596; 1926, £395,441; 1925, £520,000. Metallurgical coke appears to find a difficulty in recovering its trading abroad. During the nine months, 484,500 tons were shipped, as compared with 374,639 tons in 1926, and 855,863 tons in 1925. The tonnages of 1925 and 1927 tell a tale, as do also the sterling figures. The value of metallurgical coke in the nine months of this year was £592,612; in 1926, £428,511; and in 1925, £1,066,498.

TAR PRODUCTS.

During September, benzole showed a considerable improvement upon recent business—860,271 gallons being exported, as compared with 526 gallons in September, 1926. The total for the nine months this year was 889,712 gallons, which compares with 420,058 gallons in 1926. The demand for naphtha from abroad is negligible. Regarding tar, oil, creosote, &c., the exports during September reached 4,412,574 gallons, as against 933,472 gallons in the same period of 1926. In the nine months this year, the total of the shipments was 29,480,998 gallons, compared with 33,922,750 gallons in the same period of 1926.

SULPHATE OF AMMONIA.

The sales of sulphate of ammonia abroad in September were considerably better than in the corresponding month of last year. The quantity was 27,606 tons, which compares with only 9725 tons in September, 1926. The total for the nine months was 188,809 tons, as against 143,683 tons for the corresponding period of 1926. Spain and the Canaries and Japan still constitute our best customers. The former have taken 70,720 tons during the nine months, as compared with 36,787 tons in the same period of 1926. Japan has purchased 57,747 tons, as against 36,930 tons in the corresponding period.

GAS OIL IMPORTS.

The importation of gas oil continues to decline in comparison with the coal stoppage months. In September, 4,174,593 gallons were received, as compared with 11,531,015 gallons in September, 1926. The total for the nine months this year was 75,840,204 gallons, as against 74,334,063 gallons in the corresponding period of 1926.

A Text Book of Automatic Cooking.

After a great deal of hard work and testing of recipes, Messrs. Radiation Ltd. have produced a standard "Radiation Cookery Book," which gives a large number of up-to-date cooking recipes, all correctly marked with the "Regulo" settings and cooking times. Of course, the information is for use with "New World" and "New World Junior" automatically-controlled cookers; and the first section of the book explains the working parts of the cooker, and gives a few hints on the method of cleaning—also some useful information regarding boiling and stewing. Then, in turn, ten sections deal with soups, fish, entrées, poultry and game, vegetables and salad, puddings, cold sweets, bread, biscuits, cakes, and pastry, breakfast and supper dishes, and miscellaneous recipes. The final section deals with whole-dinner recipes. All the constituent dishes of a full dinner can be inserted in the oven at the one time with one "Regulo" setting, and removed together. The "Radiation Cookery Book" is well bound, and will doubtless become very popular among housewives.

Trenching Machine Operating Costs.

In the early spring of last year the Allentown-Bethlehem Gas Company purchased a trenching machine, by the use of which it has been possible to show considerable saving over hand-labour methods. This saving has been particularly evident in the digging of trenches for the laying of gas mains along country roads, and in certain sections of the city and suburbs still in process of development, where the streets have not yet been paved. Accurate data have been kept of the operating, maintenance, fuel, and other costs, hours of operation, &c.; and writing in the "American Gas Association Monthly," Mr. W. G. B. Woodring (Engineer to the Company) says an analysis of this data shows that approximately 31,000 ft. of trench for the laying of 2 in., 4 in., 6 in., 8 in., and 12 in. mains was dug during the period April to December, 1926. The actual digging time was 526 hours out of 1865 available working hours for this period, or 28·22 p.ct. The balance was divided between maintenance, moving, and lost time, due to rain and other causes. The total cost of digging the 31,000 ft. of trench, including the depreciation figure, which was placed at 10c. per foot, amounted to 14·8c. per foot. Other items included in this cost are operating, maintenance, moving, cleaning trench after digger, gasoline, and oil. A comparison of costs of laying 4-in. main with and without the use of the digger shows that with the digger, including the depreciation figure, there was a saving of 13c. per foot. Omitting the depreciation figure of 10c. per foot, the saving on the 4-in. main would amount to 23c. per foot. The saving per foot increases with the size of pipe laid. For 6-in. main, including depreciation, the saving amounts to 19c. per foot, and for 12-in. main to 92c. per foot. The machine has been found very useful, particularly on short jobs, as it is light, and can readily be hauled from one place to another. If the jobs are close together, the machine is run under its own power at a speed of 4 miles per hour.

"Ropeway Transport."

There is little printed information to be had on ropeways; most of it consisting of descriptions of individual installations, and notes appended to the catalogues of the various firms which design them. No doubt this is one reason why ropeways have not been made use of in England to the extent that might have been expected. "Ropeway Transport," by A. J. Knight, B.Sc., M.I.Struct.E., is a paper containing simple diagrams illustrating the action of a ropeway; and it describes the relative advantages of the different types for different classes of work. Instances of successful installations are cited ranging from the important ropeway known as the Dorado Air Line to a small installation for carrying sand across a clay-pit. It is not likely that the advantages of ropeway transport for considerable distances will be overlooked, particularly when the ropeway from the Tilmanstone Colliery is in operation and delivering 150 tons of coal per hour at Dover; but the author's claim that the ropeways of short length and light capacity will often show a profit over the other forms of transport deserves careful consideration by all firms hampered with high transport costs. The paper, which was printed in the "Structural Engineer" for May, and is now reprinted by the author in booklet form, should be particularly useful to the manager or director who has a transport problem to face, particularly transport of raw material in bulk across country to the nearest railway station. Some figures dealing with actual cost are included, which would be of use in the preparation of a preliminary report for a board meeting. The comparison of the cost of a ropeway one mile long with that of a similar one a quarter of a mile long is interesting, and indicates that the cost is proportional to the square root of the length, rather than to the length itself, for the distances under consideration. It is rather surprising to learn that the capacity of a ropeway may be doubled for an additional initial outlay of about 15 p.ct.; and the natural conclusion is that it is advantageous for a firm to instal a ropeway with a capacity in excess of its actual needs, if future expansion is contemplated.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Address by Prof. J. W. Cobb.

The Annual General Meeting of the Yorkshire Junior Gas Association was held on Saturday, Oct. 22, in the Lecture Theatre of the Fuel Department of the Leeds University. Mr. S. T. S. MUSGROVE, of Sheffield, the President, occupied the chair.

The PRESIDENT expressed his pleasure at the splendid attendance, which marked the interest the members took in the work of their Association. His pleasure in welcoming the members was increased by the fact that he could offer their greetings to a gentleman who might possibly be a stranger in person to most of them, but nevertheless one whose reputation had preceded him. He was delighted to introduce to them Mr. J. Terrace, of the South Suburban Gas Company, and a Vice-President of the Institution of Gas Engineers. In order to show in a practical manner his real interest in Junior Gas Associations, Mr. Terrace had come to their meeting, and he (the speaker) was sure all would appreciate the honour paid them. They were also glad to acknowledge the presence of Mr. J. Bridge, of Elland, who had done an enormous amount of work in connection with the Education Scheme.

Commenting on the annual report, the President regretted that the membership showed a slight decrease. This was a matter to which all should give serious attention, for in the large area covered by their Association it should be easily possible not merely to keep up their membership roll, but to increase it year by year.

The President called attention to one item of expenditure in the balance-sheet—namely, delegates' expenses to Education Committee meetings. Perhaps their members would like to know to what this referred. The Institution Education Scheme had led to much discussion. Many amendments and improvements had been effected during the past year, and the Association's representatives had attended two meetings in London and one in Manchester in regard to this matter. No doubt all would have read through the medium of the Technical Press of the actual work done, and at the moment the only observation he wished to make was that the Scheme as it stood at present made it possible for practically every student in the gas industry, in whatever circumstances he might be placed, to receive the necessary instruction to enable him to qualify for the examinations. Personally he had been much pleased with the attitude taken in regard to those students who were situated at gasworks more or less isolated from training centres. It was now possible for all these students to receive the necessary instruction in special subjects. The appointment of District Committees was a good move. In Yorkshire, for instance, it meant that they now had a Committee capable of dealing with any difficulty a student might bring before it, and very willing to do everything possible not only to remove the difficulty, but to offer suggestions, and possibly assistance, in regard to future progress.

Mr. F. CLEGG (Huddersfield), in moving the adoption of the report and balance-sheet, congratulated their Hon. Treasurer on the substantial increase in the Association's bank balance. No item called for criticism; and the Association was to be congratulated upon its choice of officials. While they regretted the resignation of Mr. E. J. Sutcliffe, they could heartily congratulate him upon his new appointment, and wish him success. With regard to their old friend Mr. Wood, they had lost a staunch supporter and hard worker; but he hoped that in his retirement he would be able to enjoy the good things in life in the full measure in which he had given his services while a member.

Mr. H. RHODES (Bradford) seconded.

JUNIORS AND THE EDUCATION SCHEME.

Mr. J. BRIDGE (Elland), who is a member of the Joint Council, supporting the resolution, spoke of the increasing interest which was being taken in the work of Juniors generally. At the last meeting of the Joint Council they had the pleasure of welcoming delegates from the Scottish Junior Gas Association (Western District), and they were looking forward to welcoming the Scottish Junior Gas Association (Eastern District) at their next meeting. If that hope was fulfilled, they would for the first time in their history be a fully representative body, which proved the progress they were making. A tremendous amount of work was being done on the Joint Council in regard to the Junior Associations. With regard to the Education Scheme, many of the modifications obtained were the direct result of recommendations submitted by the Junior Associations in regard to cases of difficulty and hardship. Last year they had the opportunity of pointing out to the Advisory Committee of the Institution of Gas Engineers where the Scheme failed; and as a direct result of the suggestions made, the Scheme had been modified and improved. The speaker confessed to a certain disappointment in regard to the number of students who had so far approached the District Committees. The work these bodies had been able to do had resulted in an appreciable advance in the number of applications to sit for the examinations, but they looked forward to still bigger calls being made upon them. He could assure all students that any inquiries they might make would receive sympathetic and helpful consideration by the Committee. These bodies had altogether removed the old obstacle which had troubled students—namely, that when their applications were forwarded to London, they were considered by a body not fully conversant with local difficulties. Mr. C. H. Chester, their President-Elect, was Hon. Secretary for the Yorkshire District Committee. Mr. Bridge concluded by congratulating the Yorkshire Junior Association on its healthy position.

The resolution was carried unanimously.

[The annual report of the Association states that the membership is now 172—a decrease of five during the year. The credit balance is £106, compared with £75 at the commencement of the year.]

NEW OFFICERS.

President.—C. H. Chester, Wakefield.
Senior Vice-President.—S. H. Packer, Bradford.
Junior Vice-President.—F. Firth, Leeds.
Hon. Secretary.—J. W. Horwill, Bradford.
Assistant Hon. Secretary.—R. Crowther, Elland.
Hon. Treasurer.—H. Wilde, Bradford.
Council.—J. W. Holroyd (Elland) and R. N. Webb (Leeds).
Representatives on District Education Committee.—C. H. Chester (Wakefield), J. W. Horwill (Bradford), C. T. B. Roper (Bradford), and R. N. Webb (Leeds).
Auditors.—A. W. Arnold (Bradford) and F. Lodge (Wakefield).

Mr. MUSGROVE (the retiring President), asking Mr. Chester to take the chair, stated that every member knew how hard Mr. Chester had worked for the Association. It was a pleasure to hand over the reins of office to such a whole-hearted enthusiast; and he hoped his term of office would be a pleasant one in every way.

PRESENTATION TO MR. MUSGROVE.

Mr. CHESTER expressed thanks to his predecessor and to the members. His first duty as President was a most pleasing one. In conformity with the custom of the Association, he had to present to their retiring President a token of their respect and thanks for all the efforts he had so willingly made in the interests of the Association. In handing Mr. Musgrove the Medallion of the Association, he hoped it would be a permanent reminder of services which had been greatly appreciated.

Mr. MUSGROVE thanked the members.

Mr. F. LODGE, in proposing a vote of thanks to the retiring President, Officers, Members of Council, and Auditors, emphasized the great debt which the members owed to these officials, and particularly to Mr. J. W. Horwill, the Hon. Secretary, and Mr. H. Wilde, the Hon. Treasurer, who, jointly, were probably more responsible than anyone else for the healthy condition of the Association.

ADDRESS

of Prof. J. W. COBB, C.B.E., B.Sc., F.I.C.

[SUMMARY.]

I have no doubt that most of you have seen in the account of the proceedings at the annual general meetings of the Institution of Engineers, which are held each year in June, reports described as those of the Gas Investigation Committee. As a rule, each of them is a fairly lengthy document, and deals with some particular subject, which varies from year to year, in considerable detail. That Committee has now issued eighteen reports, dating from the year 1918 onwards, and representing the result of the co-operation during that time of the Institution of Gas Engineers and the University of Leeds—a co-operation for which I think a considerable degree of success can fairly be claimed.

What I want to do this afternoon is to give a general review—necessarily very imperfect, and shorn of all detail—of the work of this Committee, in order to make clear to you what the Committee has been doing, and how one part of its work connects on to another—something which it is difficult, perhaps, to appreciate unless for some reason you happen to have been associated with the work intimately, or to have followed it out year by year with special care and attention.

To clear the ground, I may say that this Gas Investigation Committee had two predecessors on which the University and the Institution had already collaborated. One of these was the Gas Heating Research Committee, which for the first time made a systematic investigation of the gas fire, and worked out what has since come to be known as the "Leeds" method of determining the radiant efficiency. Another was the Ventilation Research Committee, which investigated for three years

the ventilating effect of gas fires and burners—a subject the importance of which is only now coming to be appreciated—and established clearly and quantitatively that a gas fire, properly fixed, is efficient not only as a radiant heater, but as a ventilator.

It was at the beginning of 1917 that the Gas Heating, Lighting, and Ventilating Research Committee put forward proposals to the Institution for research into problems which the new conditions, created by the war, had made much more urgent. These proposals were accepted by the Institution; and a larger Gas Investigation Committee was formed, with the smaller Committee acting as Research Sub-Committee. Gas practice had to some extent departed from traditional lines, partly from the necessity for extracting benzene and toluene, and partly through other causes. It was plainly desirable to know what were the really essential things in determining the fitness of gas for public supply, and the Committee set out to investigate the relative efficiency in use of different grades and composition of gas when employed in typical appliances. The necessity for actual trials arose out of a condition of affairs which is not uncommon. There was no lack of confident opinion, but a complete lack of agreement. It was plainly necessary to subject the whole matter to experimental investigation.

Even before the issue of the first report in 1918, the necessity for the investigation had been made more apparent by the action of the Government in asking the late Sir George Beilby, the Head of the Fuel Research Board, to advise them as to what form the statutory regulation of gas supply ought to take—which meant that he wanted the answers to the very questions we had commenced to investigate. As a matter of fact, the results of our investigations were freely used, with due acknowledgment by him, for the purpose.

The behaviour of a number of gases was examined in the ring burner, the gas fire, and the incandescent lighting burner; Mr. J. W. Wood being appointed Research Chemist for the purpose. The influence of inert constituents was established by the addition of nitrogen and carbon dioxide to the gas under test. The principle which was acted upon later in the Gas Regulation Act of charging for gas according to its content in therms was shown to be applicable over a wide range of composition and calorific value. Much of this work was carried out in a laboratory of the Birmingham Corporation Gas Department, placed at our disposal for the purpose; while for the special testing of gas of a low calorific value (about 400 B.Th.U., made by free steaming in vertical gas retorts) the tests were carried out at the Uddingston Gas-Works. This accounts for the First, Second, and Third Reports.

Departing from chronological order to discuss all the work on the utilization of gas, I would point out that the new Gas Regulation Act brought the recording gas calorimeter into prominence, and owing to the difficulties which were plainly to be encountered in the design and use of such an instrument, it was thought advisable to make thorough tests.

The Fifth (1921) and the Eighth (1923) Reports contain the results of the detailed study made of the Simmance and the Fairweather recording calorimeters; the Beasley recorder also receiving some attention. This work was much appreciated both by the Institution and by the designers of the calorimeters. Mr. Wood and his Assistant, Mr. Howarth, were deservedly congratulated upon it.

The use of different grades of gas varying in their requirements, chemical composition, and specific gravity had made plain the necessity for a much closer examination of the aeration of burners (the determination of such things as the effect of altering pressure and specific gravity upon aeration); and this was the next subject investigated.

In the first place, a simple apparatus made of glass tubing was employed, and this was followed up by an examination of the aeration phenomena as exhibited by various heating and lighting burners. In this connection, the method of determining the specific gravity of gas by balancing a column of it against air was fully examined and approved. These results were set out in the Ninth, Eleventh, and Thirteenth Reports, submitted in 1923, 1924, and 1925.

Attention was then turned from the thermal efficiency of utilization of different gases which had been first examined, and from the aeration of burners, to a rather different, but important, subject—the examination of the products of combustion from typical gas appliances, with special reference to carbon monoxide. It became evident at once that the quantities which would have to be determined were so small that it was essential to work out with the closest attention to detail the problem of the accurate determination of carbon monoxide. This was an exacting piece of work; and the Fifteenth Report, 1926, dealt specially with the subject.

The method of determination having been placed on a proper footing, it was applied successfully to a study of the gas fire. The sound position in this respect of the modern gas fire was established, and the difference was brought out between a flame burning freely in the open and one in which some foreign body, such as the radiant of a gas fire, was immersed. This work is being continued.

Now one of the main benefits conferred by the Gas Regulation Act upon the gas industry was that a greater freedom of choice was given to the gas engineer in determining the grade and composition of gas which he would supply, while stress was laid upon maintaining the supply uniform. With the freedom of choice so bestowed, it became very desirable to know not only what were the relative efficiencies of different grades of gas in use, but what were the efficiencies with which the different grades and compositions could be made. Accordingly, a set of experiments parallel with those which I have just described was instituted on efficiency in manufacture; and Dr. Parker was appointed as Research Chemist for this purpose. The work began by an investigation of the steaming of vertical gas retorts, and was carried out at the Uddingston Gas-Works on a set of Glover-West retorts placed at our disposal for the purpose by Mr. Lawrence Hislop and the Bothwell and Uddingston Gas Company. Tables were drawn up as a result of these experiments representing the thermal efficiency obtainable with different rates of steaming, proceeding even to complete gasification; and these were accompanied by chemical balances for carbon, nitrogen, and sulphur, telling the whole story much more completely than it had ever been told before. The results were submitted in the Fourth Report, 1920.

Steaming in vertical gas retorts may be regarded as adding, to the coal gas, water gas made in the retorts. It was evidently of importance to compare with it the manufacture of water gas made from coke in separate generators, and that was the next piece of work taken in hand.

A blue water gas plant was investigated by permission of the Birmingham Corporation Gas Department at their Adderley Street Works. That was followed up by an investigation of a carburetted water gas plant. A thermal analysis showed that the thermal efficiency of the water gas process as a whole was brought up by carburetting the gas, because the oil cracking was itself thermally a very efficient process. It also showed where the principal losses were located, and that one of these, the loss in the blow gas, could be materially diminished by the use of waste-heat boilers.

The Sixth Report (1921) and Seventh Report (1922) dealt with blue and carburetted water gas and the use of the waste-heat boiler, while the Tenth Report (1923) dealt with the effect of different fuel depths on the efficiency of the blue water gas process. The results obtained from the waste-heat boiler on the water gas plant had been such as to justify a further examination of what might be done by that means in another connection; and with this in mind, a test was made on waste-heat boilers attached to settings of Woodall-Duckham vertical retorts at the Windsor Street Works, Birmingham. The results so obtained in these different tests have been widely utilized. To anyone curious as to their effect, I would recommend a comparative examination in technical literature of the tests on gas plant published before and after the issue of the Fourth Report of the Gas Investigation Committee—that dealing with the steaming of vertical gas retorts.

The thermal efficiency of modern gas plants well designed and worked has now reached a high standard, but there is ample opportunity for progress to be made, particularly in the speeding-up of the process and increasing the output per unit of plant. It is essential for this purpose that the carbonization and gasification processes shall be studied thoroughly and in detail. Dr. Parker and his staff are now engaged on a study of that kind.

The experimental gas plant at the Leeds University, erected by Mr. Henry Woodall and his friends as a memorial to the late Sir Corbet Woodall, is being utilized for this purpose. It lends itself, in the way that a larger installation could not, to precise control and to modification in detail to suit particular experiments. It was found at an early stage that accurate balances could not be established in a porous fireclay retort; and this has been replaced satisfactorily by one of "cronite" metal which is gas-tight.

A description of the plant was made in the Fourteenth Report, and the first part of these studies in carbonization on the influence of the size of coal was issued as the Sixteenth Report in 1926.

In 1927, the Eighteenth Report was issued, which brings us to the end of the published work. This concerned itself with further studies which have been made on the influence of the size of coal and of temperature, while the results were also incorporated of experiments made to determine the influence of adding to coal such inorganic constituents as oxide of iron, lime, and sodium carbonate, so carrying to a larger scale tests which had already been made in the laboratory.

There is a vast amount of work waiting to be done on these lines, and Dr. Parker and his staff are very fully occupied with it. No account of the work of the Gas Investigation Committee would be complete without a recognition of the guidance received from Presidents of the Institution, who have acted in turn as Chairmen, and from Prof. Smithells, who has, during the whole period, been Chairman of the Research Sub-Committee, and keenly interested in its doings.

One thing I would like to say in conclusion. Results obtained in the research work of the Gas Investigation Com-

mittee are, we believe, useful in themselves, but they fail in one of their principal objects if they do not stimulate the members of the industry to observation, thought, and intelligent experiment on their own account. There lies at all times the opportunity for those engaged in any industry, and particularly for the younger men. It is very much so with the gas industry to-day.

The PRESIDENT, commenting on the address, remarked that Prof. Cobb had rightly pointed out the necessity for continued improvement and control of gas manufacture and distribution. If the full benefits were to be obtained, it would be essential for more attention to be paid to detail.

VOTES OF THANKS.

Mr. A. WYLIE (Sheffield), in moving a vote of thanks to Prof. Cobb, coupled with it the thanks of the Association to the University Authorities for again placing the Lecture Theatre at their disposal for the annual meeting. On behalf of the Association, he thanked Prof. Cobb for the kindly manner in which he always placed his services at their disposal. The address, in addition to its high educational qualities, was a clarion call to the younger school of gas engineers, and all those connected with the production and distribution of gas. There was still an enormous field for improvement before them, and a study of the reports of the Committee, as mentioned by Prof. Cobb, would constitute a most helpful basis for their own investigations.

Mr. C. T. B. ROPER (Bradford), seconding the vote, recalled the fact that the present meeting constituted the twenty-fifth annual meeting of the Association; and all annual meetings had been held at the University. They of the Yorkshire Junior Gas Association had come to look upon Prof. Cobb as one of their family, a member who was ever ready to help in a practical manner. It was during the days of Prof. Smithells that the close relationship between the Association and the University had been born; and passing time only served to strengthen the bonds between them.

Mr. J. TERRACE (Vice-President of the Institution of Gas Engineers) supported the motion. He said he had taken the opportunity of paying them a visit in his official capacity in order to show his interest in the Junior Gas Association movement. For more years than he cared to remember he had kept closely in touch with the Junior Gas Associations throughout the country, but he felt nevertheless that he should in an official capacity show that interest as far as lay in his power. He brought from the Institution their best wishes for the work the Association were doing, and he had to convey the Institution's best wishes to the newly-elected President of the Association. The Institution of Gas Engineers appreciated and recognized the work being carried on by the Junior Gas Associations throughout the country. The Yorkshire Association had been in existence for many years; and during that time the understanding between the parent body and the Junior Gas Associations had improved considerably. Each individual Association was part of the whole machinery; and it was owing to the markedly successful manner in which the branches throughout the country as a whole had carried out their share of the work that the results obtained were so satisfactory. While he did not wish to emphasize any particular point, he hoped they would pardon his touching upon a subject which had already been mentioned—that of the Education Scheme. What had already been said of the part they had taken in recent developments fitted in with what he had been trying to express of the ability of the Junior Gas Associations to take their full share in the working of the general machinery of the gas industry. They were aware that, in the latest development of the Education Scheme, the Junior Gas Associations had taken an active part. The whole Scheme came from the Juniors. It was put through and worked out in co-operation with the Institution; but when it was eventually launched, like many other things it was found to be faulty in certain details. He was glad, however, to find that the negotiations, discussions, and experiences which followed had the effect of remodelling the Scheme into one which now appeared to be really workable. There had been no need to depart in any way from the high ideal with which they started—namely, to evolve an education scheme, not an examination scheme. Not a little was due to the efforts of the Juniors, but they also owed a debt to the Education Authorities, who had many times come in for a great deal of criticism. The results would, he hoped, justify all that had been done.

As the representative of the Institution he felt a keen interest in the work the Yorkshire Juniors were doing. He would like to leave with the Association one message. The gas industry started very simply. In some respects even to-day methods did not differ fundamentally from when it was started. He would like to feel sure that the Junior Associations would approach the various problems of the industry from totally different points of view from the generally accepted ones—to strike out in an entirely new and original path, but not necessarily one eccentric or revolutionary. He would ask them to look at the subjects in all their phases from their own individual points of view, instead of following blindly on the lines of those who had gone before. It was only by such means that real progress would be made. The Education Scheme was a practical illustration of what could be accomplished by bringing to bear upon any one subject or matter the varying points of view with the sole idea of helping forward. The same spirit would carry them over any obstacle the industry may be called upon to face.

Prof. COBB, in acknowledging the vote of thanks, said that the Leeds University Authorities were pleased that the Yorkshire Junior Gas Association had formed the habit of holding the annual general meetings there. The members had rightly said that the Fuel Department of the University took a deep interest in the Yorkshire Junior Gas Association. As for himself, he had nothing but pleasant memories of talks with the members of the Association.

Following the meeting, the members adjourned to the Griffin Hotel for tea.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas Blending.

SIR,—I have read with a great deal of interest Mr. Robert Sturrock's paper on "Gas Blending" in the "JOURNAL" for Sept. 14.

Apparently the gases issuing from the stack valve during the blow are not saved. Since the composition of these gases undoubtedly is similar to the producer gas used for heating the retorts, it would seem that it would be worth while to collect the gas in a small holder and utilize same for heating the retorts. From some calculations I have made, about 69 p.ct. of the 45 lbs. of coke used to make 1000 c.ft. of blue gas is consumed during the blow. If this gas were collected and used for heating the retorts, it would reduce the amount of bench fuel used by about 25 p.ct.

I wonder if Mr. Sturrock was able to determine whether the blue gas, in passing through the hydraulic main of the coal gas benches, was enriched by picking-up light oil vapours. I have made some experiments on introducing producer gas into the hydraulic main of Glover-West continuous vertical retorts, and found that the B.Th.U. of the producer gas was increased from 114 to 141 as a result of picking-up light oil vapours from the hot tar.

It seems to me that Mr. Sturrock has partially solved one of the great problems with which we are confronted—namely, increasing the capacity of an existing plant at a minimum expense.

BYLLESBY ENGINEERING AND MANAGEMENT CORPORATION,
L. J. WILLIEN,
Operating Gas Engineer.

231, *South La Salle Street,*
Chicago, U.S.A.,
Oct. 4, 1927.

A copy of the foregoing letter was sent to Mr. Sturrock, who has sent the following reply for publication:

SIR,—I am indeed very interested in the points Mr. Willien raises in connection with the paper on "Gas Blending" which I read recently to the North British Association of Gas Managers.

With regard to the first point. A pilot light is kept burning at the stack valve, and after the run very little combustible gas is left in the generator. For fully five minutes of the blow period the gases which issue from the stack valve do not become ignited; it is only for the last minute of the blow that the gases are combustible. It would therefore prove very difficult to collect this gas, and to ensure a proper mixture which would prove suitable for the purpose suggested.

As to the second point. It is very interesting to hear of Mr. Willien's experiences in introducing producer gases into the hydraulic main of continuous verticals, and the interesting results he obtained. Our experience in Ardrossan has been similar. The blue gas enters the foul main and passes along the full length of the retort bench, where it meets the hot gases and vapours from the horizontal benches. We have not been able to determine accurately to what extent the calorific value is thereby increased; but we are convinced that the blue gas is enriched by contact with the light oil vapours from the hot tar.

I might mention that the initial cost of the plant, including excavating and foundations, was £1180. This is a point which I omitted to mention in the paper; and as I have since received inquiries as to the cost, it may not be out of place to state it now.

I am indebted to Mr. Willien for the points he has raised, and thank you for your interest in the matter.

ROBERT STURROCK,
Engineer and Manager.

Gas-Works, Ardrossan,
Oct. 24, 1927.

REGISTER OF PATENTS.

Wet Gas Meters.—No. 253,913.

ENGSTFELD, H., and GASWERKSBAU-UND-MASCHINENFABRIKS A.G., both of Vienna.

No. 15,057; June 15, 1926. Convention date: June 19, 1925.

The patentees state that an objection to certain wet gas meters with rocking measuring elements is that it is necessary to maintain the liquid in two parts at different levels, which requires packing or seals difficult to construct and unreliable in operation.

The object of the present invention is to provide a meter in which the mass of the rocking parts is greatly reduced, the driving power resulting from the operation of the meter is increased, and the construction generally is simplified.

They use a measuring element consisting of measuring sections connected with each other which have a common rocking axis; and each has a partition parallel to the axis, the bottom edges of which dip into the liquid. The gas conducting and distributing elements are arranged substantially at the centre of the meter.

The patentees then go into the details of their meter; and the specification is a remarkable one, in that the text covers 45 pages and the 51 claims nearly 3 pages, while there are no fewer than 53 drawings.

Extracting Neutral Oils from Tar, &c.—No. 256,933.

WITTEK, H., of Beuthen, Germany.

No. 15,048; June 15, 1926. Convention date: Aug. 12, 1925.

The separation of the neutral constituents of tar, tar oil, and pitch from the acid constituents, mainly phenolic bodies, is effected, according to this invention, by dissolving, with alcohol or other organic solvent not soluble in paraffin oil, crude coal tar, and agitating the solution with paraffin oil or some oil mainly composed of paraffins. The paraffin oil extracts the neutral oils from the alcoholic solution. Layers are formed by the extraction; the layer containing the paraffin oil being almost free from phenol, and the alcoholic solution retaining nearly all the acid oils.

Instead of paraffin oil, any oil composed mainly of hydrocarbons of the paraffin series—for example, petroleum distillates—may be used. Ethyl alcohol may be replaced by any other organic solvent or mixture of solvents capable of freely dissolving phenols and not miscible with the paraffin oil or other solvent composed mainly of paraffins—examples are wood spirit, acetone, and the like, and mixtures of alcohol and benzole or tetra-chloride of carbon or the like. The kind of oil containing paraffin which is used depends on the purpose for which the extracted neutral oils are intended.

The agitation may be performed in the vapour phase, and with application of heat or pressure. For working in the vapour phase, vapours of the alcohol, the tar oil, and the solvent mainly composed of paraffins are mixed, agitated, and condensed; and two layers are obtained.

The agitation with paraffin oil may be repeated as required; and it is advisable thereafter, in order to complete the separation, to add to the alcoholic phenol layer a few p.ct. of water, and to shake the mixture well. This separates the small amount of paraffin oil and other neutral oils retained by the alcoholic solution, leaving a solution of phenol free from neutral oils; and the phenols can be separated by distilling off the solvent.

The associated layers of neutral oils may be washed once or twice with their weight of water, and then separated from the solvent paraffin by distillation, unless the mixture is to be used as it is. The solvent, composed mainly of paraffin oil, can be re-used for subsequent extractions.

Removal of H_2S.—No. 271,805.

STILL, C., of Recklinghausen.

No. 19,303; Aug. 4, 1926. Convention date: May 25, 1926.

The process which forms the subject of this invention belongs to the class in which an aqueous suspension, containing ferrous and ferric hydroxides or carbonates and circulating in a closed circuit, is utilized in a first step for washing the gas in order to fix the sulphur by means of compounds of iron, and in a second step is oxidized and regenerated by treatment with the oxygen of the air, so that impure sulphur is floated off as a foam and the liquid can be utilized again for washing the gas.

One of the objects of the invention is to obtain the sulphur in a highly concentrated form—that is, with a relatively small proportion of iron compounds. Another object, when washed liquids containing an alkali are used, in which case part of the sulphur is combined to form an alkali thiosulphate, is to obtain highly concentrated solutions of this alkali thiosulphate.

The main features of the invention are shown in the following claims:

The arrangement in which a suspension permanently containing not more than 2 p.ct. of iron is employed in the circular path, the sulphur-containing foam floated off from the regenerator being treated in a separate vessel, distinct from the regenerating apparatus, in order to separate the sulphur again as a foam from the regenerated liquor before the latter is re-used for washing the gas.

Effecting the regeneration of the suspension in a relatively high and narrow tower entirely filled by the liquid; the oxidizing air being introduced under pressure into the bottom of the tower.

Rendering the wash liquid alkaline by the content of ammonia present in the gas, and, for this purpose, preserving the original content of ammonia in the gas before the latter is introduced into the process.

Employing the wash liquid in a closed circuit until a highly concentrated solution of thiosulphate of ammonium has been formed.

The arrangement in series of a scrubber for washing the gas, a relatively high oxidizing tower into the bottom of which the liquid containing the matter in suspension flowing from the scrubber is forced and into which the oxidizing air is introduced at the same time, and a receptacle connected to the upper end of the tower adapted to receive and then to separate the suspension consisting of iron and sulphur as a foam.

Gas from Heavy Oils.—No. 271,907.

CHILOWSKY, C., of Paris.

No. 14,536; May 19, 1926. Convention date: July 16, 1925.

This invention has for its object a process of transforming heavy oils into gaseous products, in which the cracking of the oils is effected by partial internal combustion at temperatures between 900° and 1000° C. The mixture afterwards traverses a refractory or metallic catalyst.

In carrying out the process, air, preferably heated, is added to the heavy oil; and the latter is suitably atomized in such proportions that partial combustion is attained with the formation of carbonic acid and water vapour and the liberation of a large quantity of heat, which divides the molecules of oil into hydrogen, carbon, and light hydrocarbons. The temperature of the whole is then equal to or above 900° C. This temperature, which is that required for the formation of water gas, allows the liberated carbon to react with the steam to produce carbon monoxide and hydrogen, the aggregation constituting water gas; and there is obtained, finally, carbon monoxide, light hydrocarbons, in particular methane and its homologues, and possibly hydrogen.

Telescopic Fitting for Gas Lamps.—No. 277,172.

FOSTER & PULLEN, LTD., and GILL, A., both of Bradford.

No. 22,702; Sept. 15, 1926.

In various types of lamps, say the patentees, there is often a considerable variation in distance between the lamp fitting and the stand pipe, and this entails considerable fitting to make the necessary joint. The invention is in the nature of a fitting which may be said to be standard, in that for a reasonable range of length between lamp fitting and stand pipe the one fitting is adapted to be used without additional cutting or threading.

Broadly, the fitting comprises a length of piping of suitable external diameter screwed at one end to fit the burner fitting, but plain at the other end to enter the stand pipe—usually a length of about 6 in. will be sufficient. This pipe is bound round with a suitable packing such as asbestos string, which is a tight but slidable fit on the pipe.

The upper end of the pipe is threaded to fit the lamp connection; and resting on the packing and free to be moved up and down the pipe is an externally screwed bush member. The lower end of the pipe is plain, and is of a diameter to enter the stand pipe, the upper outer end of which is threaded. On the lower end of the pipe, below the packing, is a screwed member, screwed below to engage the stand pipe thread and screwed above to receive the bush beforementioned.

The plain end of the pipe is pushed into the stand pipe. The upper end of the pipe is secured to the burner or other fitting. The screwed member is screwed on to the stand pipe. The packing is forced into the upper part of the screwed member, and the bush is screwed thereinto; and a firm, gas-tight joint is thus made without the necessity for cutting or threading connecting pieces.

Burner Nozzles.—No. 277,196.

HOWLETT, M., & Co., LTD., and ROSE, A. G., both of Birmingham.

No. 28,996; Nov. 17, 1926.

This invention is particularly applicable to nozzles made of refractory material and used for inverted incandescent lighting. In this type of nozzle it is usual to make some provision to reduce the liability of the burner to light-back; and one method has been to arrange transversely across the upper part of the nozzle a disc having a large number of small perforations.

According to the invention, the disc is provided with two or more peripheral projections which engage in slots in the upper part of the body of the nozzle; and the disc is retained in position by cementing the projections into the slots.

Coin Freed Meters.—No. 277,457.

MAJOR, P. F. E., of Shepherds Bush, W. 12, and COIN CHANGE PATENTS, LTD., of Budge Row, E.C. 4.

No. 17,623; July 14, 1926.

The coin-change mechanism of this invention is of the kind which has a bent angle main frame, a toothed actuating wheel operated by a reciprocating pawl carried on the change coin removing slide, and locked and unlocked by a bolt operated by the coin of higher value when moved by its actuating slide. A feature is that the latter slide is carried by, and adapted to slide in, a channel guide, screwed or secured to the back face of the frame plate. Another feature is the provision of means for preventing fraud.

The mechanism is fully described and illustrated in the specification.

Thermostatic Control of Water-Heating Apparatus. No. 278,108.

DRAKE, J. W., of Halifax.

No. 17,365; July 12,1926.

The patentee states that in heating apparatus, wherein water is circulated, and wherein it is desirable at all times to keep such water at an even temperature, it has been proposed to control automatically the escape of waste gases from the boiler furnace, the draught on the chimney, and the supply of fresh air to the furnace by the actions of a thermostat. Along similar lines he now patents:

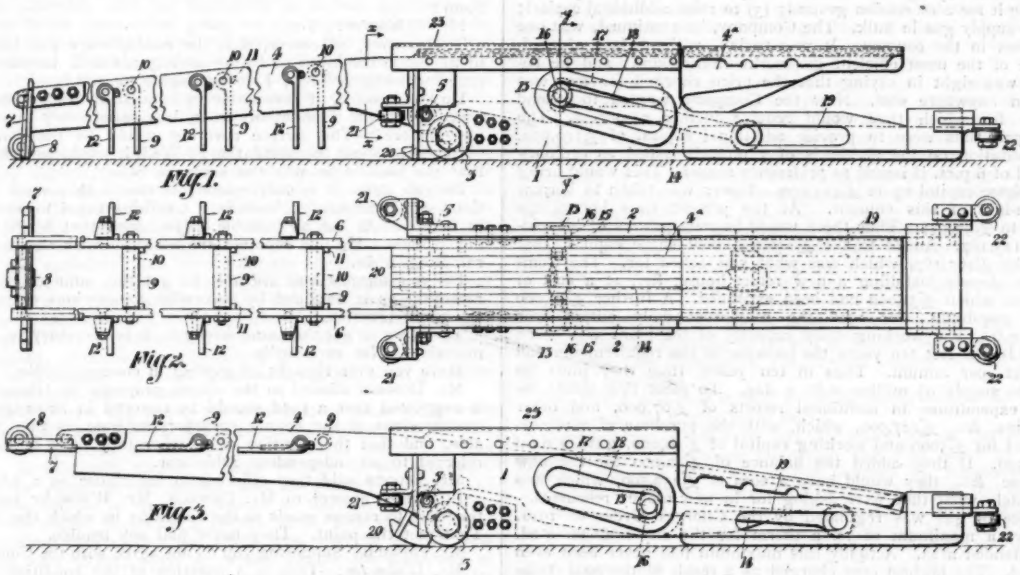
The employment of a thermostatically operated double acting damper which may be adjusted to control and deflect the escaping of the effluent gases from the furnace as well as the inflowing fresh air to the uptake past and beyond the effluent gas opening, while means are provided for preventing the damper from entirely closing the effluent opening. Means are also provided whereby the damper is connected to the door of the furnace to enable the two to act simultaneously.

Discharging and Charging Retorts.—No. 278,081.

GIBBONS BROS., LTD., of Dudley, and COOK, N. G., of Sedgley.

No. 16,426; June 30, 1926.

This invention relates to the type of charger-discharger covered by patent No. 188,550 (see "JOURNAL, Vol. 160, p. 686); and the present object is to provide an improved construction whereby the retort can be filled completely from side to side and also whereby the need for a clearance at the top of the retort for the return of the ram is obviated.



GIBBONS' CHARGER-DISCHARGER.

Fig. 1 is a side elevation of a machine constructed according to the invention, with the ram in the charging position; fig. 2 is a plan view; and fig. 3 is a similar view to fig. 1, but shows the ram in the raised position for withdrawal.

The charging device comprises a carriage 1 having side plates 2 spaced apart by distance members. The front of the carriage may be mounted on side rollers 3, although this is not necessary. A ram 4 is located between the side plates 2 of this carriage, and is pivotally mounted on the cross pin 5. This ram 4 comprises longitudinal side bars 6, rectangular in cross section, which are spaced apart by distance members; and the rear 4a of the ram is formed by laminated plates or of cast or forged material. The forward end of the ram carries a pusher plate 7 which is pivoted on the side members of the ram. A roller 8 is carried at the lower end of the pusher plate. Drag plates 9 are pivoted at intervals on distance pins 10; and stop pins 11 prevent the drag plates pivoting beyond the vertical. Drag plates 12 are also pivotally mounted on the outer side of each longitudinal member 6, and are similarly prevented from pivoting backwardly. These drag plates thus enable the complete width of the retort to be charged. Some or all of the drag plates 9 may be omitted when the drag plates 12 are sufficient to carry the fuel forward.

The dimensions of the ram are such as not to reduce materially the charge, nor have a return drag on the coal; and the forward portions of the members 6 are conveniently arched so that when an average amount of carbon deposit is on the roof of the retort the drag plates, when returning from the retort, are at the highest possible point.

At the commencement of the return movement, the forward end of the ram is pivoted upwardly, which causes the pusher plate 7 and drag plates 9 and 12 to pivot forwardly and ride over the top of the fuel. This is effected by means of the pin 13 carried by the forward end of the connecting rod 14. This pin 13 has rollers 15 and 16 which respectively engage in slots 17 in the ram and the inclined slots 18 in the carriage. The rod 14 is connected to an articulated chain which is utilized in the usual manner for operating the ram. On the retrograde stroke, therefore, the rollers ride down the slots 17 and 18 leaving the carriage stationary but causing the ram to pivot upwardly about the pin 5. This movement is assisted by the weight of the rear end of the ram. The slots 18 are of increased depth at the rear end to enable the ram to be capable of a limited pivotal movement, when in the raised position; and therefore there is no need to provide a clearance between the raised forward end of the ram and the top of the retort.

The front link of the articulated chain may have side pins which engage in slots 19 in the side plates in the carriage; and the front of the carriage has a pivoted laterally projecting plate 20 to push forward the fuel during the charging movement, the bottom of this plate being provided with a cam surface or part which will allow the plate to ride over any fuel left in the retort. The fore part of the carriage 1 is fitted with a cover plate 23.

Fastening Rubber Pads to Purifier Covers. No. 278,139.

MILBOURNE, R. J., of Lilleshall, and BEARD, G. F. H., of Upper Muxton.

No. 19,950; Aug. 12, 1926.

This invention relates to means for fastening rubber pads to the covers of gas purifiers and other apparatus, and has for its object to dispense with jointing materials, such as solution or cement, and to obviate perforating the cover by "spot" welding. To this end the pads are secured by metallic strips or clips arranged on each side of the pad.

In a suitable construction, short metallic strips in the form of angle pieces are used. One part of each is suitably secured to the purifier cover, while the other part extends at an angle of about 45°, and is so arranged as to rest on and grip a lip or bead formed on the rubber pad. These clips are arranged in short lengths alternately on each side of the pad, and are suitably shaped to the contour of the rubber where necessary for guiding it round the corners of the cover. In this manner, the rubber pad may be easily removed and replaced as desired.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Oct. 26.]

Nos. 27,443—28,163.

BURTON, A. E.—"Dip pipes for gas manufacture." No. 27,702.
COSTERTON, H. A.—"Power-gas plant." No. 28,112.
COTTON, H. F.—"Gas governors." No. 27,534.
CRAIG, G.—"Low-temperature distillation of coal." No. 27,842.
ENGELHARD, INC., C.—"Gas analysis apparatus." No. 27,486.
GAS LIGHT AND COKE COMPANY.—See Burton, A. E. No. 27,702.
GORDON, K.—"Treatment of coal distillation gases." No. 27,513.
HAY, S.—See Burton, A. E. No. 27,702.
HUGHES, J.—See Gordon, K. No. 27,513.
IMPERIAL CHEMICAL INDUSTRIES, LTD.—See Gordon, K. No. 27,513.
LAING, B.—"Distillation of carbonaceous materials." Nos. 27,831, 27,832.
LEECH, W. J. B.—See Burton, A. E. No. 27,702.
MCGLASSON, A.—"Gas water-heater." No. 27,508.
NIELSEN, H.—See Laing, B. Nos. 27,831, 27,832.
PATERSON, F. A.—See McGlasson, A. No. 27,508.

During September, 209 appliances were sold from the Accrington and District Gas Board's showrooms, including 139 cookers, 37 washboilers, and 30 fires. This brings the total number for six months to 999.

MISCELLANEOUS NEWS.

BOARD OF TRADE INQUIRY AT BATH.

Gas Company's Application for a Special Order.

An inquiry was held at the Bath Guildhall on Wednesday, Oct. 26, by Mr. J. F. RONCA (Gas Administrator to the Board of Trade), into an application by the Bath Gas Light and Coke Company for a Special Order.

Mr. H. F. BIDDER represented the promoters; the Parliamentary Agents being Messrs. Dyson, Bell, & Co. Others present were Mr. W. P. DONALD, for the Gloucestershire County Council; Sir SEYMOUR WILLIAMS, representing the Chipping Sodbury Rural District Council; Mr. CYRIL WILLIAMS, who appeared for a private objector; and Lady HOBHOUSE.

Mr. WILLIAMS, whose objection was taken first, said his client had a certain amount of property in the neighbourhood of the proposed extension; and he desired a clause inserted to the effect that nothing in the Order "shall exonerate the Company from any action or other proceedings for nuisance." The Company apparently had no objection in substance to the application; but they said it was redundant.

Mr. BIDDER replied that the point was fully covered by the existing law. Opening the case for the Order, he said the objects fell under four heads: (1) To extend the limits of the Company; (2) to consolidate various schedules entitling them to hold lands for the Company, to add two not important strips, and to authorize them to purchase land by agreement amounting to 20 acres, and particularly to use it for a recreation ground; (3) to raise additional capital; and (4) to supply gas in bulk. The Company, he continued, was one of the oldest in the country. It was to-day, without fear of challenge, one of the most efficient gas-works in England; and he believed he was right in saying that the price charged for gas was lower than anywhere else. Now the Company wanted to extend the plant, for which they would require further resources. The financial proposals were to provide additional capital of £140,000, with a limitation on the dividends of 7 p.ct. if issued as ordinary shares and of 6 p.ct. if issued as preference shares. This would bring the total share capital up to £445,000. Power was taken to borrow up to one-half of this amount. At the present time borrowings amounted to £99,333. Thus there would be new powers of borrowing of £123,167. Added to the £140,000 new share capital, that would make £263,167, which was what was asked for. The Company were already installing a new retort house, &c., at a cost of £71,000, of which £31,000 had been expended. A further £40,000 was thus required. For 1926 the maximum daily output was 5,600,000 c.ft. The working daily capacity of the plant was seven millions. In the last ten years the increase in the requirements had been 5 p.ct. per annum. Thus in ten years' time they must be prepared to supply 9½ million c.ft. a day. To meet this would require an expenditure in additional retorts of £67,000, and other plant, mains, &c., £127,500, which, with the purchase of a recreation ground for £5000 and working capital of £20,000, gave a total of £219,500. If they added the balance of £40,000 for the new retort house, &c., they would have a sum of £259,500, which was approximately what they were asking for in new money resources.

The price of gas was regulated by the Charges Order of 1922, which gave a maximum of 1s. a therm for the city and 1s. 4·2d. for the extended area. Actually this maximum had never been even approached. The highest ever charged as a result of the coal strike was 7d. in the city and 9·6d. outside. At present it was back to 6d. in the city and 8·6d. outside. He stressed this, because some objectors had taken this maximum as if it were the sum that was going to be charged. The extended area asked for comprised the parishes of Monkton Farleigh, St. Catherine's, Marshfield, and Colerne. The tendency of development being outwards, it was not unreasonable to suppose that the gas would be taken in the direction of Monkton Farleigh, and finally reach the village. A number of the objections had gone by agreement. In the case of the Bath Corporation, only a small drafting point remained to be settled; and they no longer opposed. Neither did the railway companies and the Wiltshire County Council any longer object. In respect of the attitude of Sir Charles Hobhouse, of Monkton Farleigh, he had no desire to prevent the supply of gas to the village; but he could not see the village ever being supplied. That was the counsel of despair. The Company did not take such a depressed view. Then there were other objections based on a misapprehension. The Order did not give the Company immunity from any action for nuisance. All persons were left with their right to proceed if a legal nuisance was created. Apart from the legal position, it had always been the desire of the Company to be of as little inconvenience to their neighbours as possible; and they had taken every step to this end. The Gloucester County Council and the Chipping Sodbury Council raised the question of price, which he had already explained. But the larger point was that the protection afforded them as rural authorities under the existing Gas-Works Clauses Act, 1847, was not sufficient; and they asked that there should be inserted in the Order provisions giving them in some ways less, and in some matters more, than the Gas-Works Clauses Act afforded. The clause the objectors asked for stated that the undertakers "shall, in accordance with the reasonable directions and to the reasonable satisfaction of the Councils' surveyor after the apparatus has been laid, restore such material and in such a manner as the surveyor shall specify to the condition and strength in which it was immediately before breaking-up, and the undertakers shall make good any subsidence of such highway which may arise at any time within three months from the completion of such restoration, but shall not be under any liability to make good or bear the cost of making good any such subsidence which may arise after the expiration of three months." Any dispute to be determined by independent arbitration.

On this point, Mr. Bidder said that, Parliament having formulated a general code which should apply to all gas undertakings, the Board would not alter it in any particular case, but leave the parties to the relationship that Parliament had said should exist between them. Every attempt to vary the statutory clause had been rejected. He mentioned the Northampton case. He did not propose to go into the merits of the clause put forward by Gloucester, but asked the Board to say that the Gas-Works Clauses Act should prevail until Parliament otherwise decided.

Mr. *J. Wesley Whimster* (Engineer and Manager to the Company) generally confirmed the figures given by Counsel. There was no physical difficulty in supplying Monkton Farleigh.

Lady HOBHOUSE said Sir Charles saw no assurance that gas would be actually forthcoming to the village.

Mr. RONCA: Do you accept what the Engineer says about the possibility of getting gas?

Lady HOBHOUSE: Certainly. She inquired the possible price.

Mr. *Whimster* said it would be round about 9d.

Sir SEYMOUR WILLIAMS asked if they would agree to a time limit?

Mr. BIDDER said five years was stipulated in the Order.

Mr. RONCA pointed out that the monopoly to supply lasted for that period.

Mr. DONALD (to Mr. Whimster): Do you think it a reasonable proposition that you should be asked by the road authority to hand back the roads in the same condition as that in which you received them?

Mr. *Whimster*: Yes.

That means, of course, that the roads, when put back, shall be in the same condition as before as regards both foundation and the covering surface?—No; I do not agree to that.

Do you consider it reasonable to hand them back with the surface covering or the foundations in a less satisfactory state than they were before?—The surface covering would be the same.

But what about the foundation?—Well, it would be difficult to prove that the foundation was the same as before.

Do you agree it is only reasonable that both surface and foundations should be handed back in a condition equal to what they were in before?—As far as possible. He added that he had never had any trouble. He had replaced the material with the same material, ramming it in.

Do you suggest you are able to get the same cohesion by mere ramming as is obtained by successive generations of traffic?—It is the usual practice.

Therefore to get the same strength, it is necessary to use different material?—Not necessarily.

Have you ever thought of putting in concrete?—No.

Mr. DONALD alluded to the clause proposed by Gloucester, saying it suggested that a road should be restored in accordance with the specifications of the county surveyor, so long as they were reasonable, and that the question of whether they were or not should be referred to an independent arbitrator.

Mr. BIDDER said they objected to the clause as a whole.

In further answer to Mr. DONALD, Mr. *Whimster* said at present they had to restore roads to the condition in which they found them. That met the point. They never had any trouble.

Mr. DONALD: Supposing you do not agree with the County Council?

Mr. *Whimster*: That is a question of the condition of the road afterwards.

Do you agree that under modern conditions of road construction serious damage may be done which does not show itself within three, six, or twelve months?—I think it would show itself within six months.

The County Council are prepared, if these roads are restored in accordance with their specification, at once to take over the responsibility. Does not that seem a fair and reasonable proposition?—Well, expense comes into it a good deal.

You mean expense to the Company?—That is so.

Do you know that a clause of this description has already been given to the County Council by a number of electrical undertakers?—I was not aware of it.

Mr. BIDDER: Do you have any complaints from road authorities as to the nature and effect of your reinstatements?—No.

This concluded the Company's case.

Mr. DONALD said he was not surprised his friend declined to discuss the clause on its merits. No one could oppose their contention on its merits. The Act of 1847 was a perfectly good and sufficient remedy at the time it was granted. Its insufficiency to-day had been brought about by the revolution in road uses. There was nothing in what had taken place in the House or anywhere else that bound the Board either way. He had been given the clause by other departments, but that did not bind the Board. His contention was that there was nothing to prevent the Board's inserting it in the Order.

Mr. *E. T. Gardam* (Clerk to the Gloucester County Council) said there were similar clauses in the Wessex Electricity Bill, the Cheltenham Order, the Gloucester Electricity Order, and the West Gloucester Power Order.

Colonel *E. S. Sinnott*, C.M.G. (County Surveyor for Gloucestershire), said that a road should most certainly have material superior to the material taken out after laying mains, for cutting-in destroyed the resisting power of the consolidated sub-crust. If a road was not properly restored, they did not get evidence of it sometimes for two years. The result was that the ratepayers had to bear the cost of restoration. The period of the Clauses Act was not sufficient for the defects to show in these high-class surfaces. He attached great importance to the words "and strength."

Mr. BIDDER: You think the period of twelve months should be extended?—I do not put it that way.

Witness said he had tried to enforce his powers to get a road

restored to the *status quo ante*, and had failed. They usually restored the road themselves, and charged the body concerned. They had never taken legal action.

Mr. RONCA asked Counsel to deal further with the point, as it appeared a matter for general legislation, and not for the Board of Trade to deal with by Special Order.

Mr. DONALD asked, assuming the Inspector was convinced that a case had been made out for such a clause, to what extent he might be influenced by the fact that Gloucestershire did not pretend that its position was unique. If there were a large number of areas where the same conditions applied, was not this a case for the alteration of the general law, rather than amendment by virtue of special clauses? There was no general law on this matter. The Act of 1847 was nothing more than a collection of clauses which the experience of Parliamentary Committees had found it advisable to incorporate in Acts. It was within his knowledge that the subject-matter of these clauses had been modified again and again, both by Private Bills and by Special Orders. He suggested that it was often the custom in those cases for applicants to bring forward a case for general legislation in the hope of postponing the operation of such a clause in their particular cases. Any extension of the period under the Clauses Act would not meet the case.

Sir SEYMOUR WILLIAMS asked that whatever clause was granted to Gloucester should be granted to his authority, together with the bridge clause which Gloucester had abandoned because no bridges in their area were involved.

Mr. BIDDER said the intention of the Clauses Act was clear—that it should not be varied except in special circumstances. There were no special circumstances in this case. In the cases quoted there had been agreement. There was no precedent for the Board forcing an obligation on a company contrary to the Clauses Act; and he prayed in aid the decision in the Northampton case. The Engineer agreed that in practice no difficulty arose. If the reinstatement was not done properly, the County took up the road, relaid it, and charged who was responsible. He asked the Board to pass the Order as submitted.

SHIREBROOK AND DISTRICT GAS COMPANY'S SPECIAL ORDER.

Board of Trade Inquiry.

An application by the Shirebrook and District Gas Company for a Special Order under section 10 of the Gas Regulation Act was inquired into at the offices of the Board of Trade on Tuesday, Oct. 18, by Mr. J. F. RONCA (Director of Gas Administration). Negotiations between the Company and the opponents to certain provisions in the proposed Order have been going on for some time; and the consideration of the Order before the Director had been postponed on two occasions. These negotiations were continued on the morning of Oct 18; and the proceedings before Mr. Ronca were delayed a little, in order that complete agreement might be come to. This, eventually, was done; and an explanation of what had taken place was then given.

Mr. G. B. CROWDER (Messrs. Vizard, Oldham, Crowder, & Cash, Parliamentary Agents) appeared for the Company. The opponents represented were the Mansfield Corporation, by Mr. MARSHALL (Messrs. Lewin, Gregory, & Co., Parliamentary Agents); the Southwell Rural District Council, by Mr. F. T. VILLIERS BAYLY; and the Nottinghamshire County Council, by Mr. P. E. SANDLANDS.

The principal opposition had been from the Southwell Rural District Council; and the position with regard to that Local Authority was explained first. Mr. Arthur Valon has been acting as technical Adviser to the Southwell Rural District Council. It may be said that the draft Order proposes an extension of the limits of supply of the Company, authorizes a differential price in certain districts, empowers the Company to raise additional capital, and generally brings the provisions up to date.

Mr. VILLIERS BAYLY, explaining the arrangement come to between the Company and the Southwell Rural District Council, said the first matter was the question of the additional area of supply. In the draft Order as originally issued, a large number of parishes were proposed to be added to the present area of supply; but seven of them had been cut-out of the list, leaving-in thirteen. There was, however, to be added to clause 4 (which deals with the additional area) a provision similar to that which was inserted in the East Kent District Gas Order, 1923, by which, should the Company at the expiration of five years from the commencement of the Order have failed to lay mains in any of the added districts, or should the mains laid be insufficient to meet the requirements of any of these districts, or should the gas supply at any time be suspended without reasonable cause, the Board of Trade might, if they thought fit, after hearing the Company, order that the powers of the Company in regard to any district or part of a district so affected should cease. The next point concerned the standard price. The existing standard price of the Company—namely, 16d. per therm, with a dividend of 10 p.ct.—was undoubtedly high, and was fixed in 1920. The Company were to-day paying 10 p.ct. dividend; and, in point of fact, the price of gas was 1s. per therm. With the present standard, the Company would be entitled to pay 15 p.ct. without any reduction in the price of gas; and the Company themselves had agreed that the standard was a high one, which could hardly be justified in present circumstances. Therefore it had been arranged that the standard upon the existing capital should be reduced to 14d. per therm; and that on the new capital asked for it should be 13d. This met the objections of the Southwell Rural District Council as regards price. Clause 6 of the draft Order proposed a differential price within a radius of 3 miles of the boundary of the existing limits; but it was obviously a difficult matter to fix a radius of 3 miles from an irregular boundary line, and it had been agreed that within the added parish of Edwinstowe there should be a differential of 2d., with a differential of 3d. in the remainder of the proposed new area. Also that there should be a revision of both differentials at the end of three years, and at subsequent periods of three years. The authorized capital of the Company was £50,000; and the Order permitted them to raise additional capital not exceeding, in the whole, £50,000. The Company had issued the whole of the authorized ordinary capital, but had not exercised any borrowing powers. What the Southwell Rural District Council asked, and the Company had agreed to, was that the additional capital should be limited to £40,000, instead of £50,000, with the proviso that the Company would not issue any new ordinary capital until they had exhausted the borrowing powers in respect of the existing capital.

Mr. CROWDER remarked that the proposal as to exhaustion of borrowing powers before the issue of any new capital applied only to the borrowing powers on the existing capital

Mr. BAYLY said the Company were at present entitled to borrow to the extent of one-third of the already authorized capital; and they were empowered under the Order to borrow to the extent of one-half in respect of the new capital. The agreement was that the Company must borrow to the extent of £25,000—*i.e.*, one-half the existing capital powers—before issuing any new ordinary capital. A point had been raised with regard to roads; but this had been met by the insertion of words recognizing the Rural District Council as the road authority in the case of roads not yet made-up, but in which a supply of gas was proposed to be given.

Finally, he referred to clauses 49 and 52. Clause 49, he said, provided that the Company might, with the approval of the Board of Trade, enter into, and carry into effect, agreements with other companies for various purposes, and that any local authority of the districts supplied by the Company should be entitled to make representations to the Board of Trade in respect of such agreements. By clause 52 the Company were authorized to effect exchanges of stock or securities with other companies; but no provision was made in that clause either for the approval of the Board of Trade or for the local councils to have the right to make representations concerning such agreements. The Company had now agreed with the Southwell Rural District Council that the two clauses should be similar in this respect.

Mr. RONCA said he would want to think about that suggestion seriously before agreeing to it; and he pointed out that, in the case of the London Gas Companies, the London County Council did not ask for such protection.

Mr. BAYLY said that in that event he would ask for an opportunity to deal with the matter more fully.

Consideration of this point was then postponed for the time being.

Mr. MARSHALL said one point that had been raised by the Mansfield Corporation was as to the position of Mansfield if it extended its boundaries at any time to include any of the districts now proposed to be added to the area of supply of the Company. This matter, however, would not now be pressed, because a clause had been agreed between the parties dealing with the position of Mansfield Corporation as a gas and water authority.

Mr. CROWDER said he was prepared to accept the proposed clause; but a previous suggestion as to rights of purchase of the Company's undertaking by Mansfield in the added areas could not have been accepted by the Company, and, he understood, had been withdrawn.

Mr. SANDLANDS stated that, having regard to the agreements come to between the other opponents and the promoters, he did not oppose any longer on behalf of the Nottinghamshire County Council. The promoters would come under a standard agreement which the Council had with all public utility undertakings in the county as to rates and charges for reinstatement of roads.

Mr. BAYLY, speaking with regard to his suggestion concerning clauses 49 and 52, said his point was that the Company might effect the exchange of stocks or securities with other companies (as clause 52 stood in the draft Order) without the Board of Trade or the local authorities knowing anything of what was being done; and he asked that the agreement between the Southwell Rural District Council and the promoters that such exchanges should not take place without the consent of the Board of Trade and without the local authorities having something to say on the matter, if they desired, should be approved by the Board of Trade. The position was that in this district there were several companies the Boards of Directors of which were practically the same; and without casting any aspersions upon the gentlemen at present constituting these Boards, there was the possibility of things happening which might not be to the advantage of one or more of the companies concerned.

Mr. RONCA asked for comments on the matter on behalf of the promoters.

Mr. CROWDER said he left himself entirely in the hands of the Board of Trade in this matter.

Mr. BAYLY reminded the Director that he opposed the scheme altogether unless the addition he asked for was made.

Mr. *Arthur Valon* (Consulting Engineer) was then called to explain the position a little more fully on behalf of the Southwell Rural District Council. In addition to the view expressed by Mr. Bayly, he urged that some such safeguard as that proposed was essential in the case of a number of small companies which were not so much in the eye of the public as were the big London and similar companies. The Boards of Directors of these small companies were practically identical; and it would be possible for one company, being more prosperous than another in the district, and able to

make a bigger profit, to enter into arrangements to assist another company who were in a worse position, in a manner about which neither the Board of Trade nor the local people would know anything, if clause 52 remained in the Order as at present. It would not mean that the shareholders of one company were assisting the shareholders of another; but it would mean that the consumers in one area would be assisting the shareholders in another area. While he did not suggest it would be a usual thing, there was a serious possibility of its being done with small companies which were out of the public eye; and therefore he suggested the same procedure under clause 52 as was provided for in clause 49.

Mr. RONCA said he took it the argument was that assistance could be given by one company to another in the circumstances mentioned, out of all proportion to the commercial value of any agreement that might be entered into between the two companies.

Mr. *Valon* said that was so; and he added that it could not happen in the case of large London or similar companies, which were so much in the public eye.

The inquiry then closed.

In addition to the points mentioned at the public inquiry, the draft Order gives the Company additional powers as to the manufacture of residual products, authorizes the creation of a special purposes fund and a renewal fund, and permits of the granting of pensions and the establishment of a scheme of profit sharing. There are also a large number of common form clauses.

GAS-MAKING IN INDIA.

Interesting Reminiscences.

The Eastern District of the Southern Association of Gas Engineers, at a meeting on Oct. 27, made an interesting variation of its ordinary programme. In addition to discussing various technical matters, the Association heard Mr. A. R. Burch, late Chief Engineer of the Bombay Gas Company, describe his experiences in India. Mr. C. Valon Bennett presided.

Mr. Burch said he was in Bombay from 1906 to 1924, and during that time had always managed to keep the floods at bay in the wet season, excepting on Sept. 20, 1923, when 12 in. of rain fell in three hours, and 17 in. in six-and-a-half hours. He had driven on that occasion to the Company's offices through over a foot of water, only to receive a telephone message that the water was entering the retort house pits four-and-a-half miles away. Upon this he had managed to get within a few hundred yards of the works, when the spray kicked up by the fly wheel damped his magneto, and he had to finish his journey by walking through two feet or so of water at a temperature of about eighty degrees, but running like a mill race. He had found the position hopeless. Some of the furnaces were put out, and others could not be got at. However, the fire brigade had pumped the works out in the morning, and the gas supply was kept going, though the less said about the quality the better.

In Bombay, said Mr. Burch, temperature caused most of the troubles. One used to go inside the gasholders under test with air at three o'clock in the morning, because during the day the heat under the crown made it too dangerous a job getting in and out of the air lock. It was all right on the water, but one could not get there. Besides the heat, curious difficulties occurred in dealing with the natives. In many houses no European might enter, so that supervision of work done was impossible. In Bombay, however, such usages were not so strict as up country.

The climate made wear and tear on structures heavy, for the atmosphere was salt as well as damp, and the rotting of woodwork and steel was very rapid. The white ant attacked all wood but teak. Iron as pure as possible was the cheapest in the end. For all gasholders, roofs, services, &c., cast iron should be used wherever possible, and steel avoided like the plague. By far the best roofing was corrugated asbestos sheeting. For all exposed ironwork, grease was better than paint.

Labour, when he went to Bombay, was 4¾ annas (4½d.) a day, so that it was cheap, in spite of the fact that five men were required to do the work that was done by one man in this country. This cost, however, was more than trebled now, and the quantity of work done was nothing like so much, so that labour in Bombay now was as dear as anywhere else. The bulk of the labour was Hindoo, while Mohammedans and Parsees were mechanics, engine drivers, &c. There was great difficulty with the language; the Bombay Bât being a mixture of Urdu, Mahratti, and Gujerati, while the Goanese talked a bastard Portuguese. Occasionally, too, a man would appear, probably from South India, with whom none of the languages mentioned was the least good. Women did a great deal of the simpler work, such as clinker picking. Intelligence varied to an extraordinary degree. Some, though very few, could blow a joint with any man in this country, but often enough the coolie had little more sense than a sheep. A curious feature was the impossibility of getting work done in the comparative cool of the early morning. The works time was 8 a.m., but coolies on the coal ships, &c., would not start until 10 a.m. Few white men could do manual labour through the day in the sun at all, but it was no uncommon thing to see a coolie working bareheaded in the full blaze of the sun. It was extremely difficult to get a moderately good gasfitter or mechanic. At the Bombay Works they had only had one Mohammedan who could really be trusted with important works, mains alterations, &c.

The Bombay Works were built in 1863-67, and gas was supplied uninterruptedly, Mr. Burch believed, till Oct. 1, 1920. Then there was a strike lasting nearly three months. For five days there was no gas; but then the works were got going with a crowd of Punjabi Mussalmen, whose ordinary employment was stoking on ships. These were mentally just like children. Though many were well over six feet, and with huge beards, they would insist on sitting down for a smoke in the middle of drawing a retort. There was a period during the strike when Europeans went about in twos and threes, or were protected by a policeman; but the Company stuck to the terms it had offered at the first, and finally the strikers returned unconditionally. In later years things had been very lively with riots and strikes of mill hands.

Describing the works, Mr. Burch said that the old retort house had been extended at both ends, and was worked by Gibbon's machinery. A few generator furnaces had existed in 1906; and now, of course, all were the latest generators. He had found early that the very best fireclay goods could be obtained from the Central Provinces, and had soon stopped importing bricks, and latterly retorts also. There was little or no expansion, and combustion arches had been found perfect after four years' work. Besides the retort house, the works had been nearly rebuilt, and all connections enlarged to 24 in. For all big renewal work, such as gasholders and purifiers, one or two extra Europeans had been obtained from the contractor; all roofing and ironwork for the retort house being made in the Company's own shops or in local foundries.

In routine gas-making, the only things of note were that the original tower scrubber would not function to remove H_2S and CO_2, owing to the liquor being above 90°. The naphthalene nuisance had been eliminated by washing with fuel oil in a rotary washer, and the tar fog which used to cause endless trouble in the oxide purifier had been completely trapped by a centrifugal scrubber. Coals at first had been from Yorkshire, South Africa, or Australia, but recently had been entirely from Bengal. As the Indian mines got deeper, the quality of the coal had improved, till now the best was equal to the best Durham, though the ash content was still high. Gasholders were often an anxiety, owing to the extremes of temperature from early morning till early afternoon. Internal corrosion was a great trouble; the gas containing over 3 p.ct. of water vapour, as well as oxygen and carbon dioxide.

Other matters of interest mentioned by Mr. Burch were that they used wet meters exclusively, because the leathers of dry meters soon hardened and became useless. With the naphthalene difficulty overcome, the great enemy was rust in services; and here again wrought iron as pure as possible, and galvanized, was preferable to steel however thick. In 1906, gas was employed practically for lighting only; but in 1924 80 p.ct. was used for other purposes. Industrial work of every description, domestic water heating, and cooking, constituted the bulk. As might be imagined, no gas was used for fires, but a little was employed for drying clothes and boots in the wet season.

There was a Social Club; the Club house being an old bungalow on the works. Here was erected a stage on which Europeans and Indians gave plays and variety entertainments. Some of the plays given by the Indians were excellent, and the acting was splendid. There were also a billiard table, two hard tennis courts, and a fine garden. A successful cricket eleven had been run on the Maidan.

GAS REGULATION ACT APPLICATIONS.

AMENDING ORDER.

Berkhampstead Gas Company.

An application has been made by the Company to substitute for the standard price of 18d. per therm a standard price of 14d. per therm.

INAUGURATION OF NEW HOLDER AT STRATFORD-ON-AVON.

Increasing Demand for Gas.

On Monday, Oct. 24, a new holder of a capacity of 440,000 c.ft., erected by Messrs. C. & W. Walker, Ltd., was officially inaugurated by Mrs. F. Ballance (wife of the Chairman of the Stratford-on-Avon Gas Committee). Immediately following the ceremony Mr. R. J. Milbourne (Managing Director of Messrs. Walker) presented Mrs. Ballance with a suitably inscribed silver rosebowl. After inspection of the work, those present were entertained at tea by the Corporation.

The MAYOR (Councillor E. R. Thompson) said that the day's proceedings marked another milestone in the progress of the Corporation's gas undertaking. This was the first holder to be erected by the local authority, who acquired the undertaking in 1879. He congratulated Messrs. Walker on the construction of the holder, and Messrs. Thos. Vale & Sons, Ltd., of Stourport, on their successful work in connection with the tank.

Alderman BALLANCE expressed appreciation of the Mayor's hospitality. He mentioned that during the last six years—since the appointment of Mr. F. Shewring as Gas Engineer and Manager—the output of gas had increased by 36 p.ct. The Gas Committee considered themselves fortunate in having the services of such excellent contractors and of such an admirable Engineer.

Mr. MILBOURNE remarked that the Corporation had a very valuable property in their gas-works, the business of which was carried on by a Committee possessed of the ability and energy one would expect of a paid directorate. Gas had a big future; and no doubt before another 27 years went by, Stratford would require another holder.

Mr. R. P. VALE (Managing Director of Messrs. Vale) followed with a few words of praise for Mr. Shewring and Mr. G. A. Peppercorn, who had been Messrs. Vale's representative on the work.

Mr. SHEWRING said he was glad to know that his efforts had met with approval. The contractors had done their part thoroughly, which was no more than he expected, as they had a world-wide reputation to maintain.

COKE OVEN GAS FOR REDCAR.

Inauguration of Supply.

The prospect of further reductions in the price of gas at Redcar, as the result of the utilization of surplus gas from the coke ovens at the Redcar Ironworks, was mentioned by the Mayor (Alderman W. S. Hill) when he inaugurated the scheme on Saturday, Oct. 29.

The possibility of cheapening Redcar's gas by securing from Messrs. Dorman, Long, & Co. the surplus gas from the coke ovens has long attracted those most actively concerned with the borough's gas undertaking, but it was only in the early part of this year that the Corporation came to terms with the Company; settlement being reached on the basis of 9d. per 1000 c.ft.

To convey the gas from the ironworks to the gas-works it was necessary to lay three miles of 15-in. main, the pipes for which were supplied by a Teesside firm, Messrs. Cochrane & Co.

The inauguration ceremony consisted of the opening of a valve which admitted the coke oven gas to the gas-works, where the final process of purifying is carried out. It was attended by members and officials of the Corporation, officials of the Company, and representatives from Saltburn and Marske, both of which townships are in the Corporation's area of supply.

Coke oven gas will form only part of the town supply, but the Mayor, in a brief speech, expressed the hope that before long the whole of the gas required by Redcar, Marske, Kirkleatham, and Saltburn would be obtained from the Redcar Ironworks. Ample provision had been made, he said, to meet any sudden emergency through the failure for any reason of the coke oven supply. The Mayor added that he saw no reason why in the early spring there should not be a further revision of gas price in favour of the consumer; and he trusted that many present would see the basic price of gas below 3s. 4d. per 1000 c.ft.

FUSED CABLE CAUSES FOUR DEATHS.

On Oct. 25, four people were found dead, as the result of some type of gas poisoning, in the bedroom of a house at 2, Leigh Place, Ardwick, Manchester. The inquest was held on Friday, Oct. 28.

Police-Sergeant Dodds, who was called in evidence, said he went to the house at 8.20 a.m.; and when he entered he noticed a slight smell of gas in the middle rooms. There was a strong smell of gas in the two front portions of the basement facing the Stockport Road. Everything there was covered with a substance like soot.

Walter Breeze, a foreman in the employ of the Manchester Corporation Gas Department, said he was instructed by Inspector Wardle at about 9.30 a.m. on Tuesday morning, Oct. 25, to proceed to the Stockport Road corner of Leigh Place, and take three men with him to investigate the cause of a reported explosion. On arrival about 10 a.m., he found the electric cables had been burnt through, and that the Electricity Department's workmen were engaged on the job. He could not detect any smell of coal gas either inside the house or outside. He was carrying out his investigation when Inspector Wardle arrived. The latter then took charge of the work. He came to the conclusion that there was no sign of coal gas. He had the main stripped along the front of the house, and found no leakage in it. He left for Rochdale Road Gas-Works at noon, giving Breeze instructions not to leave until his return. At about 12.15 p.m., Mr. Clarke, Assistant Mains Engineer to the Electricity Department, reported to him that his men had found a crack in the 12-in. gas main at a spot opposite the passage. On going to the place, Breeze noticed a slight crack in the main. He went to the corner of the street for his men. By the time of his return, the crack, in his opinion, had travelled further up the side of the main; the length in all being about 8 in., and the width hardly large enough to take the sharp edge of a pen-knife blade. He reported this to Inspector Wardle, who returned to the job. Along with Inspector Wardle, he had given the main special attention at this point earlier in the morning, because it was opposite to the place where the electric cable had burned out. They found no crack in the gas main in their earlier inspections, but the main was very hot.

A. Lawrence Lunn, Deputy Chief Engineer to the Electricity Department, said that he examined the premises about noon on Oct. 25. He found an open culvert near the fault leading to the cellar. There was a strong smell of gas in the cellar.

The Coroner (Mr. C. W. W. Surridge) observed that the evidence showed that gas was generated through a fault due to a fuse, and travelled to the room by the culvert, cellar, cavity wall, and skirting. He asked whether Mr. Lunn had considered what precautions could be taken to prevent a tragedy of this sort arising from a breakdown.

Mr. Lunn replied that when old property was being pulled down, or any alteration made, such a culvert would be destroyed or filled up.

The Coroner asked Mr. Lunn whether he had formed any opinion as to the cause of the trouble.

Mr. Lunn replied that the initial fault was undoubtedly due to the cable.

Mr. H. Heep, the City Analyst, said that the blood of all four victims of the tragedy showed traces of carbon monoxide. The soot was carbonaceous. Carbon monoxide was found in coal gas and also in bitumen gas. Had it been merely a leakage from the gas main, there would have been no carbon; and copper, which was found in the soot, was not a usual ingredient. The heat generated by the fusing of the cable was sufficient to distil the insulating material; and on this coming in contact with the oxygen in the air, which would be limited, it would result in the production of carbon and carbon monoxide. There was no evidence to suggest there had been any leak in the gas main prior to the fusing of the cable.

The Coroner said there must be a danger from the proximity of electric cables to gas mains. He recorded a verdict of "Death from misadventure."

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The better tone of the previous week has been fairly well maintained, and on the whole the market remains more hopeful than for some time past. There is still not very much definite booking of forward contracts; but big buyers are showing increasing interest in all positions up to the end of next year, which is a sign that they probably regard prices as unlikely to go lower. Producers, on the other hand, are not inclined to offer coals at recent prices; but in many cases negotiations are proceeding which may lead to contracts, and these are always regarded as the basis of successful colliery working.

Wear Specials and best quality gas makes continue to quote 16s. f.o.b., and are generally in a good position for November. Seconds are nominally 13s. 6d. to 13s. 9d., and the demand has improved considerably in the last fortnight. Durham coking is still more active than for some time, and 13s. 6d. to 14s. is the quoted price; collieries asking the higher figure steadily for forward business. Best Durham bunkers are well booked, and ask 14s. 6d. to 15s. 6d. for prompt, while promising negotiations for shipment over next year are in progress. Seconds quote 13s. 6d. to 13s. 9d. Northumberland steams are still in a serious position, and at 13s. to 13s. 6d. for best screened sorts and 9s. 6d. for smalls they are far from making ends meet.

Gas coke remains in steady demand, and is well booked for November, the current quotation being round 24s. f.o.b. for shipment.

YORKSHIRE AND LANCASHIRE.

While contract prices for gas coal fixed during the summer are low, it would doubtless be possible just now to buy even cheaper for immediate delivery. If industries generally do not improve, the present situation is likely to continue for some little time.

The household coal trade is dull for the time of the year, and in consequence collieries are not fulfilling expectations in respect of increased working hours. Many pits which have a large proportion of house coal available are still on short time.

Industrial fuels continue to be offered at remarkably low figures; and the smaller descriptions have been quoted very low indeed, reductions of some shillings having taken place during the past few weeks. Even this has not brought about a clearance of accumulated stocks. Buyers are evidently under the impression that there is no limit to the reduction, so that with furnace coke in poor request slacks of all descriptions are at a discount.

The export market has no redeeming feature, although in some quarters a better tone prevails.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 16s. 9d. to 17s. 3d.; screened gas coal, 16s. to 17s.; washed trebles, 16s. 6d. to 17s.; washed doubles, 14s. 9d. to 15s. 3d.; washed singles, 14s. 9d. to 15s. 3d.; washed smalls, 10s. 6d. to 10s. 9d.; rough slack, 8s. 9d. to 9s. 3d.; smithy peas, 17s. to 18s. per ton. West Yorkshire—Hartleys (f.o.b. Goole), 14s. 6d. to 15s. 6d.; screened gas coal, 14s. 6d. to 15s. 6d.; washed trebles, 16s. 6d. to 17s.; washed doubles, 15s. to 15s. 6d.; washed singles, 15s. to 15s. 3d.; washed smalls, 10s. to 10s. 6d.; unwashed trebles, 15s. 6d. to 16s.; unwashed doubles, 11s. to 11s. 6d.; rough slack, 9s. 3d. to 9s. 6d.; coking smalls, 8s. 6d. to 9s. per ton. Derbyshire and Nottinghamshire—Top hards, 17s. to 18s. 6d.; washed doubles, 15s. to 16s.; washed singles, 15s. to 15s. 6d.; washed smalls, 10s. 6d. to 11s.; rough slack, 8s. 9d. to 9s. 3d. per ton. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 14s. 6d. to 15s. 3d.; gas coke, 23s. to 25s.; furnace coke, 18s. 6d. to 19s. 6d. per ton.

In Lancashire, the market is quiet; but industrial fuel is having a rather better trade. Average prices are: Lancashire best house, 31s. to 32s.; seconds, 25s. to 26s.; common, 19s. to 21s.; kitchen, 22s. to 24s.; Yorkshire best selected house, 33s. to 35s.; best house, 29s. to 30s.; seconds, 19s. to 20s.; washed doubles, 13s. to 14s. 6d.; washed singles, 8s. to 9s.; rough slack, 7s. 6d. to 8s. 6d. in wagons at the pit.

MIDLANDS.

The market continues in a state of disorganization. With absorptive capacity falsifying calculations, it has not been possible to reduce output *pari passu*, so that the distributive channels have become choked. So much difficulty has been experienced in getting wagons to meet the demand for particular descriptions of coal that confusion has been worse confounded.

Pits generally have been reduced to about half-time working. This has involved further unbalancing of supplies, and there have been remarkable distortions of prices. In exceptional cases advances of 3s. or 4s. a ton have been enforceable in pithead rates for specified grades. On the other hand, spot lots of superabundant coal have been offered at 2s. below summer minimum without attracting buyers. Cobbles have been an exceptionally erratic feature.

The household trade has been torpid, and the demand for industrial fuel only maintains the low average that has prevailed for months past. Rough slacks have been obtainable at 5s. or less where there was special pressure to sell. Blast-furnace men are getting about 1s. a ton more for foundry pig; but the market signs are not very reassuring, and hard cokes have gained scarcely any strength.

TRADE NOTES.

Cast-Iron Pipe Contract.

The Pont-à-Mousson Iron Pipe Founders have obtained confirmation of a contract of 2200 tons of cast-iron pipes to British standard specification for Callao (Peru).

Complete Tar Distillation Plant.

At Mr. James E. Dawson's Dock Tar and Ammonia Works, Ashton Marsh, Preston, there has been recently erected, by Messrs. R. & J. Dempster, Ltd., of Manchester, a complete tar distillation plant, capable of dealing with 20 tons of tar per day.

Simplex Water-Gas Plant.

Since Mr. Robert Sturrock, of Ardrossan, read his paper on "Gas Blending" before the North British Association of Gas Managers, inquiries have been made as to the name and address of the makers of the "Simplex" water-gas plant. Perhaps it will be useful to mention that they are the Vertical Gas-Retort Syndicate, Ltd., of 17, Victoria Street, Westminster, S.W. 1.

Fuel Conservation.

Under this title a booklet has been published by the Derbyshire Silica Firebrick Company, Ltd., of Friden, Hartington. It shows how much heat can be saved by proper attention to insulation and by use of good insulating material. The booklet is written in a most interesting manner, and is excellently illustrated. A section is devoted to a description of the manufacture of insulating materials at the works of the Company. The Derbyshire silica materials have been supplied to most of the principal gas-works in this country and abroad.

C.W.G. Plant for Portsmouth.

An order has been placed with Messrs. Humphreys & Glasgow, Ltd., for a new section hand-clinkered C.W.G. plant at the Hilsea Works of the Portsmouth Gas Company. The capacity of the plant will be 2 million c.ft. of 500 B.Th.U. gas per day, when using lump coke containing 94 p.ct. of fixed carbon. The unit will be complete with turbine blowing plant, hydraulic coke charging gear, and waste-heat boiler, and will be housed in an extension of the water gas building. It will be equipped with overhead coke hoppers and screens, atmospheric condensers, and the necessary extension to the telpher track.

CONTRACTS OPEN.

Retorts, Firebricks, &c.

The City of Salford are inviting tenders for the supply of retorts, firebricks, &c. [See advert. on p. 347.]

Tar.

The Newbury Corporation are inviting offers for the purchase of their surplus crude tar. [See advert. on p. 347.]

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, Oct. 31.

There has been a decided improvement in the tone of the pitch market during the past week. Very little material is available for prompt shipment, and the price is steady at about 87s. 6d. per ton net in bulk.

Creosote is firm at 8¼d. to 9d. per gallon.

Tar spirits are unaltered, pure benzole being 1s. 5d. to 1s. 6d. per gallon, pure toluole about 1s. 10d. to 1s. 11d. per gallon, 95/160 solvent naphtha 1s. 3d. per gallon, and pyridine 6s. to 6s. 6d. per gallon.

Tar Products in the Provinces.

Oct. 31.

The markets for tar products generally are firm.

Pitch is steady. There is a considerable amount of inquiry, but at present Continental consumers appear to prefer to wait rather than pay the prices asked.

Creosote is still in good demand, both for home and export, for prompt and forward delivery.

Water-white products are quiet.

Carbolic acid is steady.

Cresylic acid is in good demand.

The average prices of gas-works products during the week were: Gas-works tar, 61s. to 66s. Pitch—East Coast, 84s. to 85s. f.o.b. West Coast—Manchester, 79s. to 80s.; Liverpool, 82s. to 82s. 6d.; Clyde, 83s. to 84s. Benzole, 90 p.ct., North, 1s. 1d. to 1s. 2d.; crude, 65 p.ct. at 120° C., 10d. to 10¼d., naked at makers' works; 50/90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluole, naked, North, 1s. 4d. to 1s. 5d. nominal. Coal-tar crude naphtha, in bulk, North, 7¾d. to 8d. Solvent naphtha, naked, North, 9¼d. to 10d. Heavy naphtha, North, 10d. to 1s. Creosote, in bulk, North, liquid, 7¼d. to 7⅝d.; salty, 7⅜d. to 7½d.; Scotland, 7½d. to 7⅝d. Heavy oils, in bulk, North, 8¾d. to 9¼d. Carbolic acid, 60 p.ct., 2s. 3d. to 2s. 4d. prompt. Naphthalene, £11 to £14; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality unsaleable.

Gas Testing at Portsmouth.—The report of the Portsmouth City Gas Examiner for the quarter ended Sept. 30 states that the purity of the gas throughout the quarter was excellent; no trace of sulphuretted hydrogen having been found. The mean pressure of the gas was 5·16 in. Regarding the C.V. tests (the declared C.V. is 450 B.Th.U.), 50 tests at Arundel Street showed an average of 451·9 B.Th.U.; 28 tests at Milton Street, an average of 454·8 B.Th.U.; and 10 at Kingston Cross 455·9 B.Th.U. per c.ft. Of 1990 gas meters tested, only 72 were incorrect.

Doncaster's Gas Centenary.

In connection with the forthcoming celebration of the centenary of gas making at Doncaster, it is interesting to know that, so far as records can be traced, street lighting by gas has been a feature throughout the hundred years. The original undertaking was the Doncaster Gas Light Company, established in 1827; and it is believed that their first measure was the fixing of about 100 gas lamps in the streets. The works to-day, under the Corporation, have 80 miles of mains throughout Doncaster and surrounding townships and villages, and an output of 450 million c.ft. per annum. The Corporation became owners of the undertaking in 1858. It was owing to the Local Authority, in 1826, deciding that the town would be better lighted by gas that the Company was formed. The Local Authority held one-third of the shares from the start, and also loaned £2700; so they had the controlling interest until they took over the undertaking entirely. Parliamentary powers to supply surrounding districts were obtained in 1904. Mr. Robert Watson is the Engineer and General Manager.

Eynsham Light, Heat, and Power Company, Ltd.—The gas supply in Eynsham has, it will be remembered, been in the hands of one of the Eaton group of Companies. It has recently been purchased from them by Mr. W. W. Topley, and by him transferred to a private Company entitled "The Eynsham Light, Heat, and Power Company, Ltd.," of which he is Managing Director. Mr. Henry Woodall, M.Inst.C.E., is Chairman.

New Gas-Works for Conway.—Contracts have been signed for the erection of a new gas-works on a site near the railway on Conway Morfa, for the Conway Town Council, at a cost of £21,000. When completed, however, it is understood that the scheme will cost about £30,000. This will be one of the most ambitious schemes entered into by the Conway Corporation, and is the result of an increased demand for gas. The new works will include the most modern equipment, and the production of gas will be nearly three times greater than is the case at the present works, which will be dismantled. The present gasholders will, however, be retained.

Overhead Wires "an Eyesore."—The growing tendency of local electrical authorities, in a spirit of economy backed by the Electricity Commissioners, to supply new districts with electricity by overhead lines, is arousing indignation in several of the charming villages on the edges of the West Yorkshire moors—villages which do a good deal in the way of catering for week-end and other holiday visitors. The people regard the tangle of overhead wires as an eyesore which would completely spoil the localities. At Eldwick, on the moor-edge above Bingley, there is great local indignation; but the Bingley District Council, ignoring local wishes, are proceeding with the erection of poles.

New Gasholder for Edinburgh.—The Gas Committee of the Edinburgh Town Council have agreed to recommend the provision of a new gasholder at Granton at a probable cost of £120,000 to £150,000. Mr. H. H. Gracie, the Engineer, in a report to the Committee, said that a new holder had become an urgent necessity. For safe and economical working, and to provide for future requirements, the storage capacity should be equal to 24 hours' maximum demand. The present storage was equal to only 18¼ hours, or 77 p.ct. of 24 hours' supply in mid-winter. All their holders, with the exception of that at Granton, were becoming obsolete. Some dated back to 1861. The Granton holder was erected in 1901.

Gas Exhibition at Steyning.—A three-days' gas cooking demonstration and exhibition, organized by the Steyning Gas Company, was held recently in the Steyning Town Hall. Mr. P. E. Browne, the Distributing Engineer of the Brighton and Hove General Gas Company, gave an address at the opening ceremony, on Oct. 18, in the presence of a large gathering. Introducing him, Mr. A. Grey (Chairman of the Steyning Company) referred to the valuable assistance rendered by the Brighton Company to the Steyning Company during the coal stoppage. Miss M. K. Gompertz, L.C.A., was the lecturer and demonstrator; and her lucid explanation of cookery methods, and hints on the use of the gas oven, were thoroughly appreciated.

Improved Gas Lighting of Wimborne.—The public lighting of Wimborne is to be improved by the provision of 27 extra lamps, on the recommendation of the Lighting Committee of the Wimborne Minster Urban District Council; and in consequence of the increased number of lamps lighted, the Committee were empowered to approach the Wimborne Minster Gas Company, Ltd., with a view to obtaining favourable terms for a new contract of either three or five years. The Committee, in their report, expressed entire satisfaction with the public lighting as at present provided, and intimated that the Council were indebted to the Gas Company for the excellent way in which they had carried out the contract for the lighting of the town. In fact, in some cases the Company had exceeded what they undertook under their contract.

On Thursday, Oct. 20, three workmen were engaged in repairs in the governor house at the Camborne Gas-Works, at Tuckingmill, when an explosion occurred. The roof was partially blown off, and the building caught fire. Two of the men had their faces burned.

The Directors of Meters, Ltd., have declared the following on account of the dividends for the current year: On the preference shares, at the rate of 5½ p.ct. per annum; and on the ordinary shares, at the rate of 5 p.ct. per annum. The dividend warrants will be posted on Nov. 15.

The importance of householders examining flexible tubes connected to their gas apparatus was emphasized at a Clayton-le-Moors inquest, on Oct. 26, on a miner who had died from the effects of gas poisoning. A rubber gas tube was badly frayed at the connecting point, and had broken away while the gas was turned on. The Coroner returned a verdict of "Accidental death through inhaling coal gas as the result of a faulty tube."

STOCK MARKET REPORT.

BUSINESS on the Stock Exchange last week was very irregular. The Industrial Market was again by far the most animated. Towards the close of the week, however, the general tone became more subdued, and there was a decided check in the dangerously high prices of the popular shares. Gilt-edged securities maintained their usual firmness, and the variations in prices were unimportant. The new issues, of course, were a restrictive factor. As was expected, the Victoria Government 5 p.ct. Loan was heavily oversubscribed. Applicants for a few hundred pounds received their allotment in full, but only about 40 p.ct. was allotted in respect of the larger applications. Subsequent dealings are quoted at from par to ½ premium.

The Foreign Market was unsettled by the uncertainty of the Continental Bourses. The new 7 p.ct. Polish loan was quoted at 2 discount; but the Brazilian 6½ p.ct. scrip was obtainable only at a small premium.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Oct. 28.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Sept. 8	5	5	Aldershot 5 p.c. max. C. .	68—78	..	..
232,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	67—70	..	..
1,551,868	,,	Sept. 29	7	7	Alliance & Dublin Ord. .	85—88	..	86—88
274,000	,,	July 14	4	4	Do. 4 p.c. Deb. . .	64—67	..	..
523,554	,,	Aug. 25	—	7	Barnet Ord. 7 p.c. . . .	103—105	..	..
800,000	1	Oct. 13	1/7½	1/7½	Bombay, Ltd.	21/—23/-	..	21/6
170,000	10	Aug 25	8½	8½	Bournemouth 5 p.c. . . .	12½—13½	..	12½
500,000	10	,,	7	7	Do. B 7 p.c. . .	12—12½	..	..
275,000	10	,,	6	6	Do. Pref. 6 p.c. .	10⅞—11½	..	..
50,000	Stk.	June 29	3	3	Do. 3 p.c. Deb. .	55—58	..	..
163,025	,,	,,	4	4	Do. 4 p.c. Deb. .	74—77	..	..
367,900	,,	Aug. 25	—	7½	Brighton & Hove 6 p.c. Con.	107—110	+3	..
341,800	,,	,,	—	6/8/6⅔	Do. 5 p.c. Con.	94—97	+1	..
1,927,800	,,	July 28	5	5	Bristol 5 p.c. max. . . .	86—87a	+½	..
885,000	,,	Sept 29	7	8	British Ord.	108—111	..	108½—111
100,000	,,	June 29	7	7	Do. 7 p.c. Pref. . .	114—117	..	..
130,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. .	74—77	..	..
200,000	,,	,,	—	83/2	Do. 5 p.c. Red. Deb. .	94—96	..	..
100,000	10	May 26	6	8	Cape Town, Ltd . . .	7⅛—8½	..	8½
100,000	10	Oct 27	4½	4½	Do. 4½ p.c. Pref. . .	6—7*	..	6½
150,000	Stk.	June 29	4½	4½	Do. 4½ p.c. Deb. . .	70—75	..	..
666,860	,,	July 23	6	6	Cardiff Con. Ord. . . .	100—103	..	..
327,940	,,	June 29	7¼	7¼	Do. 7¼ p.c. Red. Deb. .	100—103	..	..
157,180	,,	Aug 11	6½	6	Chester 5 p.c. Ord. . . .	87—92b	..	..
79,185	1	Oct. 18	†2/-	†2/-	Colombo Ltd. Ord. . . .	28/—30/-	..	..
34,495	1	,,	1/4†	1/4†	Do. 7 p.c. Pref. .	20/—22/-	..	..
221,490	1	Oct. 18	1/0†	1/0†	Colonial Gas Assn. Ld. Ord.	24/—26/-	..	..
178,900	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
2,073,280	Stk.	July 14	—	5	Commercial Ord.	89—91	..	..
475,000	,,	June 16	3	3	Do 3 p.c. Deb. .	56—59	..	58½
850,000	,,	Sept. 29	‡1	‡1	Continental Union, Ltd. .	80—85	..	..
200,000	,,	,,	7	7	Do. 7 p.c. Pref. .	82—84	..	..
727,580	,,	Aug. 11	6½	6½	Croydon sliding scale . .	98—101	+1	99—100
408,190	,,	,,	5	5	Do. max. div. . . .	80—83	..	82½
428,270	,,	Aug. 25	9	6	Derby Con.	103—105a	..	..
65,000	,,	June 29	4	4	Do. Deb.	73—75a	..	..
200,000	,,	Aug. 25	5	5	East Hull Ord. 5 p.c. .	78—81	..	..
50,000	,,	June 16	5	5	Eastbourne 5 p.c. Deb. .	90—95	..	..
1,008,180	10	Sept. 29	†3	†4	European, Ltd.	6½ 7½	+½	6⅞—7 1/16
13,747,480	Stk.	July 28	5	5	Gas Light & Coke 4 p.c. Ord.	90—92	..	90—91½
3,600,000	,,	,,	8½	8½	Do. 8½ p.c. max. . . .	60—62	..	61—62
4,127,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	75—78	+½	76—77
5,922,630	,,	June 16	3	3	Do. 3 p.c. Con. Deb. .	59—61	..	59½—60 7/16
131,315	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	102—105	..	..
1,442,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. .	99—101	..	100½—100⅞
43,080	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
88,800	,,	Aug. 25	6½	6½	Hastings & St L. 5 p.c. Conv	88—91	..	..
288,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	72—75	+3	71
70,000	10	Oct. 18	†10	†10	Hongkong & China, Ltd. .	12—13	..	..
178,200	Stk.	Aug. 25	5	5	Hornsey Con. 3½ p.c. . .	65—68	..	..
1,970,000	,,	May 12	10	10	Imperial Continental Cap.	144—147	+1	144—145½
223,130	,,	Aug. 11	3½	3½	Do. 3½ p.c. Red. Deb.	68—76	..	..
228,242	,,	Aug. 11	6½	7	Lea Bridge 5 p.c. Ord. . .	94—97	..	..
2,145,907	,,	Aug. 11	6½	6½	Liverpool 5 p.c. Ord. . .	85½—86b	..	..
600,000	,,	Sept. 29	7	7	Do. 7 p.c. Red. Pref.	101—103b	..	..
186,726	,,	Aug. 25	8	9	Maidstone 5 p.c. Cap. . .	107—112	..	..
68,480	,,	June 16	3	3	Do. 3 p.c. Deb. . .	52—55	..	..
75,000	5	June 16	†7	†8	Malta & Mediterranean .	5½—6½	..	..
641,920	Stk.	May 26	†5	†7	Montevideo, Ltd.	91—93	..	..
2,081,818	,,	July 28	5	5	Newcastle & Gateshead Con.	76½—77½d	..	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref. .	69½—70½d	..	..
691,705	,,	June 29	3½	3½	Do. 3½ p.c. Deb. .	66½—67½d	..	..
131,785	,,	Aug. 25	—	6/13/0	North Middlesex 6 p.c. Con.	93—96	..	..
300,000	,,	Apl. 28	9	7	Oriental, Ltd.	100—102	..	..
188,190	,,	June 29	7½	7½	Plym'th & Ston'house 5 p.c.	105—110	+3	106
414,800	,,	Aug. 25	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	102—105	..	..
226,782	,,	,,	5	5	Do. 5 p.c. max.	76—79	..	..
2,389,909	1	—	—	—	Primitiva Ord.	19/8—20/8	—/9	19/11½—20/7½
282,200	100	June 1	4	4	Do. 4 p.c. Red. Deb. . .	84—86	..	85—85½
900,000	Stk.	July 28	4	4	Do. 4 p.c. Red. Deb. 1911	72—74	..	73½ 74
484,962	,,	June 29	—	4	Do. 4 p.c. Cons. Deb. . .	72—74	..	73—73½
180,000	10	Sept. 29	6	6	San Paulo 8 p.c. Pref. . .	7⅞—8½	..	..
195,000	50	June 29	5	5	Do. 5 p.c. Red. Deb.	47—49	..	..
270,000	Stk.	Sept. 8	5½	5½	Sheffield A	101—103c	..	..
419,968	,,	,,	5½	5½	Do. B	101—103c	..	..
1,047,000	,,	,,	5½	5½	Do. C	101—103c	..	..
90,000	10	May 26	4	6	South African	4—6	..	..
6,809,895	Stk.	Aug. 11	7	5	South Met. Ord.	102—104	..	102½—103½
300,000	,,	—	—	—	Do. 6 p.c. Irred. Pf.	110—113	..	..
1,895,445	,,	July 14	3	3	Do. 3 p.c. Deb. . .	57—60	..	60
784,000	,,	Sept. 8	6½	6½	Do. 6½ p.c. Red. Db.	101—103	..	..
91,800	,,	Aug. 11	8½	8½	South Shields Con. . . .	101—103d	..	..
1,342,795	,,	July 28	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	104½
388,887	,,	June 16	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Sept. 8	5	5	South'mpton Ord. 5 p.c. max.	75—78	..	..
131,275	,,	June 29	4	4	Do. 4 p.c. Deb.	73—76	..	..
350,000	,,	Aug. 25	7	7	Swansea 7 p.c. Red. Pref. .	103—106	..	..
200,000	,,	June 16	6½	6½	Do. 6½ p.c. Red. Deb.	100—103	+½	..
150,000	,,	July 28	7½	7½	Tottenham District A 5 p.c.	105—108	..	..
682,275	,,	,,	6½	6½	Do. B 3½ p.c.	89—92	..	91½
150,000	,,	,,	5½	5½	Do. 3½ p.c. Pref.	95—98	..	..
181,365	,,	June 16	4	4	Do. 4 p.c. Deb.	72—75	..	..
288,251	,,	Sept. 29	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, & Wycombe 5 p.c. . . .	81—83d	..	..
289,094	,,	Aug. 25	6½	6½		85—90	..	86
88,880	,,	,,	5	5	Do. 5 p.c. pref. .	88—88	..	87
80,000	,,	July 14	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c. .	117—122	..	..
855,896	,,	,,	7	7	Do. B 3½ p.c. .	100—105	..	..
432,531	,,	,,	5/12/0	5/19/0	Do. C and New	88—93	..	..
800,000	,,	,,	6½	6½	Do. Wimbledon 5 p.c. .	100—105	+2	101½—102½
90,000	,,	,,	7½	7½	Do. Epsom 5 p.c. . .	102—107	+2	104½—105½
200,000	,,	,,	5	5	Do. 5 p.c. Pref . . .	85—90	..	..
88,416	,,	June 29	3	3	Do. 3 p.c. Deb. . . .	55—58	..	..
284,743	,,	,,	4	4	Do. 4 p.c. Deb. . . .	74—77	..	..

Quotations a :—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle e.—Sheffield. * Ex. div. † Paid free of income-tax. ‡ For year.

The Gas Market was again well supported. Prices continue to improve, and quite a number of the ordinary stocks were marked up. Parcels of stocks of three south-coast companies improved appreciably; Brighton 6 p.ct., Hastings 3½ p.ct., and Plymouth 5 p.ct. being marked up 3 points. Primitiva eased off after the recent rise, but transactions were recorded above par. Reports from the companies show that the abnormally mild weather during the past few weeks had brought about a reduction in the gas sales, but the loss of business is not likely to affect materially the accounts for the year.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 86, 86¼, Bristol 5 p.ct. 85½, Cape Town 4½ p.ct. preference 6½, Commercial 3 p.ct. debenture 58½, European 6½, Gas Light and Coke 90½, 90⅝, 90⅞, 91, 91⅛, 91¼, 3½ p.ct. 61, 4 p.ct. preference 76, 3 p.ct. debenture 60, 60 1/16, 5 p.ct. debenture 100⅛, Hastings and St. Leonards 3½ p.ct. 71, Imperial Continental 145½, Primitiva 20s., 20s. 1½d., 20s. 3d., 20s. 3⅛d., 20s. 4¼d., 20s. 6d., 20s. 7⅛d., 4 p.ct. consolidated debenture 73, 73½, South Metropolitan 102, 102½, 102⅝, 103, South Suburban 5 p.ct. 104½. Supplementary prices, Croydon 4 p.ct. debenture 75½, Hampton Court 5 p.ct. 103.

On Tuesday, British 108½, Croydon sliding-scale 99, 100, European 6 7/16, 6⅝, 6 11/16, Gas Light and Coke 90½, 90⅝, 91, 3½ p.ct. maximum 62, 3 p.ct. debenture 60, 5 p.ct. debenture 100⅜, 100⅝, Imperial Continental 145, Primitiva 19s. 9d., 19s. 10¼d., 20s., 20s. 1⅛d., 20s. 3d., 20s. 4¼d., 4 p.ct. 1st debentures 85, South Metropolitan 102½, Wandsworth, Wimbledon 5 p.ct. 101½, 102½, Epsom 5 p.ct. 104½, 105½. Supplementary prices, Ascot 10 p.ct. maximum 10½, Croydon 5 p.ct. debenture 92½, 93½.

On Wednesday, Alliance and Dublin 87, Bournemouth "B" 12½, British 110, 110½, 111, Cape Town 8½, European 6⅝, Gas Light and Coke 90½, 90⅝, 91, 91¼, 4 p.ct. preference 76½, 3 p.ct. debenture 59⅝, 60, 60 1/16, 5 p.ct. debenture 100⅛, 100⅜, Imperial Continental 144, Primitiva 19s. 6d., 19s. 7½d., 19s. 9d., 19s. 10¼d., 20s. 1⅛d., 4 p.ct. 1st debentures 85½, South Metropolitan 102½, 102⅝, 103½, 3 p.ct. debenture 60, Uxbridge 5 p.ct. 86. Supplementary prices, Brighton and Hove 5 p.ct. debenture 94.

On Thursday, Alliance and Dublin 86½, 88, Croydon maximum dividend 82½, European 7, Gas Light and Coke 90, 90½, 90⅝, 4 p.ct. preference 77, 3 p.ct. debenture 60, Imperial Continental 145, Plymouth and Stonehouse 106, Primitiva 19s. 6d., 19s. 7½d., 19s. 9d., 19s. 10¼d., 4 p.ct. debenture (1911) 73½, 74, South Metropolitan 102½, 102⅝, 102⅞, 103⅜, 103½, Tottenham "B" 91½, Uxbridge 5 p.ct. preference 87. Supplementary prices, Cheltenham 5 p.ct. 70½, 71, Liverpool 5 p.ct. 86.

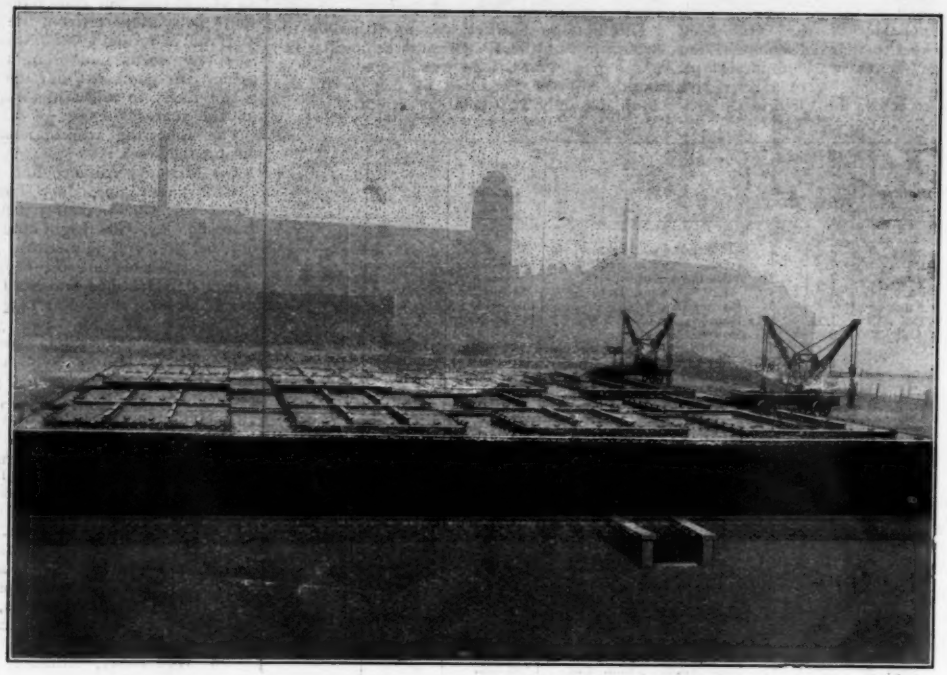
On Friday, Bombay 21s. 6d., European 7 1/16, Gas Light and Coke 90½, 90⅝, 90¾, 90⅞, 4 p.ct. preference 76½, 76⅝, 3 p.ct. debenture 59½, 60, 5 p.ct. debenture 100⅜, 100⅝, Hastings and St. Leonards 3½ p.ct. 71, Primitiva 19s. 1½d., 19s. 4½d., 19s. 6d., 19s. 7½d., 19s. 9d., 19s. 10¼d., 20s., 20s. 1⅛d., South Metropolitan 102½, 102⅝, 102⅞, 103½, 103⅜, South Suburban 5 p.ct. 104½. Supplementary prices, Croydon 5 p.ct. debenture 93½, 93½, Liverpool 5 p.ct. 85½, 86, 5 p.ct. debenture 99.

There was a considerable change in the monetary situation last week. In place of the customary ease on a Friday, new money was in strong demand at from 3⅜ p.ct. to 4 p.ct. Money was even borrowed from the Bank at 5 p.ct., and it is expected that stringent conditions will prevail during the current week. There was a sharp rise in the Treasury Bill average rate to £4 7s. 0·71d. p.ct., being about 11½d. p.ct. above the previous week's rate. The increase exerted a hardening tendency in the discount rates.

On the Foreign Exchange Market the dollar-sterling improved to 4.87½, and pesetas were slightly weaker at 28.50; otherwise there was no important changes. Francs were quoted at 124-124½; Belgas, 34.95½-96½; lire, 89½-89 5/16; and Dutch florins, 12.08¾-09½.

Silver was a quiet market, but the price rose 1/16 to 25⅞d. per oz. Gold advanced ½d., to 84s. 11½d. per oz.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21. The Banks' deposit rate is 2½ p.ct., and the deposit rates of the discount houses are 2½ p.ct. at call and 2⅝ p.ct. at notice.



HOLMES PURIFIERS at ~ BLACKBURN ~ 1926

G.P.MITCHELL Esq., M.I.Mech.E.,
Engineer.

FOR the last seventy-six years we have specialised in improvements in the design of plant for the better purification of coal gas.

Our Works are well equipped for the manufacture of purifiers of any capacity with all modern improvements.

May we send you particulars of some of our latest installations?

The new "Western" Quick Opening Valve specially designed for Purifier work will interest you.

HOLMES

"SUPER TYPE" INSTALLATIONS

Telephone
Huddersfield 1573. Private Branch Exchange.

Telegrams:
"Holmes, Huddersfield."

CONTENTS.

EDITORIAL NOTES.

British Road Tar Association 381
Coal Selling and Buying Problems 381
The "G.C.P.A." and New Gas Legislation . 382
A Conflict of Interests 383
Sulphate of Ammonia Situation 383
Extra Christmas Holiday—Floods at Fleetwood—Northumberland Clause—Gas Industry and the "A.E.U."—"Constant Pressure" Gasholders—Smoke Abatement 384

Personal 385
Obituary 385
Electricity Supply Memoranda 385
"Tottenham" Reflex Danger Signal . . . 387
Potential Investments. II.—The South Metropolitan Gas Company 387
Danks-Pattison Central Heating Plant—Highly Efficient Gas-Fired Boilers . . . 388
Extensions at Stamford (Conn.) 389
Doncaster's Gas Centenary 390
Joint Council of the Junior Gas Associations—Minutes of a Meeting in Birmingham on Oct. 13 390
Staines Waterless Holder—In Course of Erection for the Gas Light and Coke Company 391
Forthcoming Engagements 391
London and Southern District Junior Gas Association—Presidential Address of Mr. Leonard Lacey, B.Sc., Assoc.M.Inst.C.E. 392
Refractories at the Ceramic Society's Meeting 395
Notes on New Books 397
Public Works, Roads, and Transport Congress and Exhibition 397

CORRESPONDENCE.

Gas Blending 397

LEGAL INTELLIGENCE.

Chalk Fuel, Power Gas, and Bye-Products Corporation—Summons for Alleged Fraud 398

MISCELLANEOUS NEWS.

Gas Companies' Protection Association—Annual General Meeting 399
Gas Testing in the Metropolis 401
Floods at Fleetwood—Brave Efforts of the Gas Company's Resident Manager and his Men 402
Fuels of the Future—Address by Prof. S. Roy Illingworth 402

MISCELLANEOUS NEWS—(*continued*).

British Sulphate of Ammonia Federation, Ltd.—Seventh Annual Report 403
Coal Trade Reports—
North-East Coast 406
Yorkshire and Lancashire 406
Midlands 406
"Come to the Fair" 407
Current Sales of Gas Products 407
Trade Notes 407
Contracts Open 407
Stock Market Report 409

PARAGRAPHS.

Southern Association of Gas Engineers and Managers 384
Society of British Gas Industries 386
British Commercial Gas Association—Price of Gas at Strabane 397
Kirkintilloch Gas Celebration 401
Gas-Works' Fire 402
Commercial Gas Company's Discounts . . 406
Lecture at Leamington on "Modern Gas Fires"—Action Against the Dublin Gas Company—Trulite (Great Britain)—Cheaper Gas in the Peak—Nov. 11: "Poppy Day" Appeal—Bawtry's Gas Undertaking—Blackwell Company's Lighting Offer—"Colardo" Defies Fire—Derbyshire Gas Dispute 408

"JOURNAL" OFFICE TELEPHONE.

The "Journal" Office Telephone Number is "Central 6055."

For List of "JOURNAL" Advertisers, see p. 413.

GREATER TUBE SERVICE

Service under the Surface

The Bromford Weldless Steel Gas Main System

embodies many practical advantages.

1. **Economy.**—Longer lengths provided, reducing number of joints and consequent saving in handling costs. Lower maintenance costs due to saving in leakages and the fact that steel is unbreakable.
2. **Simplicity.**—Easy bending on site avoiding the ordering of "Specials."
3. **Greater Delivery Capacity.**—Reduced thickness of Tube and smoothness of bore definitely reduces friction.

Send us your enquiries.

Bromford TUBE CO LTD

BIRMINGHAM

Note the extra long continuous lengths supplied, reducing number of joints required.

'Phone: East 696-697.

'Grams: "Tubrom, Birmingham."

Instal Glover Thos Meters

They keep down maintenance charges

THOMAS GLOVER
& COMPANY LTD.
GOTHIC WORKS,
EDMONTON, LONDON, N.18.

ORIGINAL DRY GAS METER MAKERS ESTABLISHED IN 1844.

BRANCHES AT: BELFAST, BIRMINGHAM, BRISTOL, DUBLIN, EDINBURGH, GLASGOW, MANCHESTER & NEWCASTLE-ON-TYNE

PARKINSON'S

PREPAYMENT METERS.

UNSURPASSED FOR QUALITY.

FITTED WITH LONG RANGE ATTACHMENT.

Outside Valve, Easily Accessible for Cleaning.

W. PARKINSON & CO.,

INCORPORATED IN PARKINSON & COWAN (GAS METERS), LTD.

COTTAGE LANE, CITY ROAD, LONDON, E.C.1.	BELL BARN ROAD, BIRMINGHAM.	MORNINGTON STREET ORMEAU ROAD, BELFAST.
Telegrams: "INDEX, ISLING, LONDON."	"GASMETERS, B'HAM."	"PREPAYMENT, BELFAST."
'Phone Nos.: 4270 Clerkenwell	2945 Midland, B'ham.	3774 Belfast.